UNITED
NATIONS

ST

Secretariat

Distr.
GENERAL

PROVISIONAL
ST/ESA/STAT/SER.F/2/Rev.4 (Chapter VI)
15 May 1992
ENGLISH
ORIGINAL: ENGLISH/FRENCH/SPANISH

REVISED SYSTEM OF NATIONAL ACCOUNTS

CHAPTER VI

THE PRODUCTION ACCOUNT

92-23325

VI. THE PRODUCTION ACCOUNT

Table of Contents

	Page
A. Introduction	1
B. Production	2
1. Production as an economic activity	2
a. Goods and services	2
(i) Goods	2
(ii) Services	3
2. The production boundary	4
a. The general production boundary	4
b. The production boundary in the System	5
(i) Domestic and personal services produced for own final consumption within households	5
c. The production boundary within households	7
(i) Own-account production of goods	7
(ii) "Do-it-yourself" decoration, maintenance and small repairs	8
(iii) The use of consumption goods	9
(iv) Services of owner-occupied dwellings	9
d. Illegal production	9
e. Concealed production and the underground economy	10
C. The Measurement of Production	11
1. Introduction	11
2. Output	11
a. Market and non-market output	13
(i) Market output	13
(ii) Non-market output	14
(iii) Output produced for own final use	14
(iv) Output provided free, or at prices that are not economically significant	15
b. Market and non-market producers	16
D. The Measurement of Market Output	16
1. The recording of sales	17
2. The recording of barter	17
3. The recording of compensation in kind or other payments in kind	17
4. Changes in inventories of outputs	17
a. Introduction	17
b. Output, sales and changes in inventories	18
(i) Storage services	19
c. Approximate measures of changes in inventories	19
d. Changes in inventories in business accounts	20
e. Work-in-progress	22

4. The boundary between intermediate consumption and gross fixed capital formation 48
a. Small tools 48
b. Maintenance and repairs 48
c. Research and development, training, etc. 49
d. Mineral exploration 50
e. Military equipment 50
5. Non-market services 51
6. Services of business associations 52
7. The boundary between intermediate consumption and value added 52

H. Consumption of Fixed Capital 53
1. Introduction 53
2. Consumption of fixed capital and rentals on fixed assets . . 53
3. The calculation of consumption of fixed capital 54
4. The coverage of consumption of fixed capital 55
5. The perpetual-inventory-method 56
a. Calculation of the gross capital stock at current prices 56
b. Relative efficiencies and rentals 56
c. Rates of capital consumption 57
d. Values of consumption of fixed capital 58
e. Gross and net capital stocks 59
6. "Gross" and "net" recording 59

I. The Valuation of Outputs and Inputs 60
1. Introduction 60
2. Basic and producers' prices 60
a. VAT and similar deductible taxes 61
(i) Gross and net recording of VAT 62
3. Purchasers' prices 63
4. General valuation principles 64
a. Output 64
b. Intermediate consumption 64

J. Gross and Net Value Added 65
1. Introduction 65
2. Alternative measures of value added 66
a. Gross value added at basic prices 66
b. Gross value added at producers' prices 66
c. Gross value added at factor cost 67

K. The Main Aggregates Associated with Value Added 67
1. Introduction 67
2. A resume of the main identities 69
3. Domestic production 69

VI. THE PRODUCTION ACCOUNT

List of Tables

Page

Table VI.1 Account I: Production Account 71

VI. THE PRODUCTION ACCOUNT

List of Acronyms

f.o.b.	free on board
FIFO	first-in-first-out
GDP	gross domestic product
ILO	International Labour Office
ISIC	International Standard Industrial Classification
LIFO	last-in-first-out
NIFO	next-in-first-out
NPI	non-profit institution
PIM	perpetual inventory method
VAT	value added tax

VI. THE PRODUCTION ACCOUNT

A. Introduction

1. The Production Account is the first in the sequence of accounts compiled for institutional units, sectors and the total economy. The incomes generated by production are carried forward into subsequent accounts so that the way in which the Production Account is compiled can exert a considerable influence on the System. In any case, information about production is extremely important in its own right. It is therefore necessary to spell out in some detail exactly how production is measured in the System.

2. Production accounts are compiled for establishments and industries as well as for institutional units and sectors. Basic concepts such as output or intermediate consumption have therefore to be defined and measured in the same way whether they appear in the Production Account for industries or sectors. Overall numerical consistency requires that the output of an institutional unit engaged in production - that is, an enterprise - should be equal to the sum of the outputs of the individual establishments of which it is composed. As these outputs include deliveries of goods or services to other establishments belonging to the same enterprise, such inter-establishment deliveries are counted as part of the output of the enterprise as a whole even though they do not leave the enterprise.

3. The Production Account for institutional units and sectors is illustrated in table VI.1. They contain only three items apart from the balancing item. The output from production is recorded under resources on the right hand side of the account. This item may, of course, be disaggregated to distinguish different kinds of output. For example, non-market output should be shown separately from market output in the sector accounts, when possible. The inputs recorded under uses on the left-hand side of the account consist of intermediate consumption and consumption of fixed capital. Both of these may also be disaggregated.

4. Most of this chapter is concerned with defining and describing the three basic elements - output, intermediate consumption and consumption of fixed capital - that enter into the Production Account. The balancing item in the Production Account is value added. It can be measured either gross or net: that is, before or after deducting consumption of fixed capital:

(1) gross value added is defined as the value of output less the value of intermediate consumption;

(2) net value added is defined as the value of output less the values of both intermediate consumption and consumption of fixed capital.

5. As value added is intended to measure the additional value created by a process of production, it ought to be measured net, since the consumption of fixed capital is a cost of production. However, as explained later, consumption of fixed capital can be difficult to measure in practice and it may not always be possible to make a satisfactory estimate of its value and

hence of net value added. Provision has therefore to be made for value added to be measured gross as well as net. It follows that provision has also to be made for the balancing items in subsequent accounts of the System that depend upon value added - operating surplus, mixed income, balance of primary incomes, etc. - to be measured gross or net of the consumption of fixed capital.

B. Production

1. Production as an economic activity

6. Production can be described in general terms as an activity in which an enterprise uses inputs to produce outputs. However, it is necessary to specify what is meant by "input" and "output" to make such a description more operational. The economic analysis of production is mainly concerned with activities that produce outputs of a kind that can be delivered or provided to other institutional units. Unless outputs are produced that can be supplied to other units, either individually or collectively, there can be no division of labour, no specialisation of production and no gains from trading. There are two main kinds of output, namely goods and services, and it is necessary to examine their characteristics in order to be able to delineate activities that are productive in an economic sense from other activities.

a. Goods and services

(i) Goods

7. Goods are physical objects over which ownership rights can be established and whose ownership can be transferred from one institutional unit to another by engaging in transactions on markets. They must also be objects that some units wish to own: that is, for which a demand exists. The exchange of ownership of a good is a separate activity from its production. The same good may be bought and sold any number of times after it has been produced. When a good is produced, it may not be known who will eventually own it, or even whether it will be sold or exchanged. The separation of the original production of a good from its subsequent sale or resale is reflected, for example, in the distinction between the producer's and purchaser's price of a good that passes through wholesale or retail distribution. This separation of production from subsequent exchange is an economically significant characteristic of a good that is not shared by a service.

(ii) Services

8. Services are not separate entities over which ownership rights can be established and they cannot be traded separately from their production. Services are heterogeneous outputs produced to order and typically consist of changes in the conditions of the consuming units realised by the activities of producers at the demand of the consumers. By the time their production is completed they must have been provided to the consumers.

9. The production of services must be confined to activities that are capable of being carried out by one unit for the benefit of another. Otherwise, service industries could not develop and there could be no markets for services. It is also possible for a unit to produce a service for its own consumption provided that the activity is such that it could have been carried out by another unit.

10. The changes that consumers of services engage the producers to bring about can take a variety of different forms - in particular:

(1) changes in the condition of the consumer's goods: the producer works directly on goods owned by the consumer by transporting, cleaning, repairing or otherwise transforming them;

(2) changes in the physical condition of persons: the producer transports the persons, provides them with accommodation, provides them with medical or surgical treatments, improves their appearance, and so on;

(3) changes in the mental condition of persons: the producer provides education, information, advice, entertainment or similar services;

(4) changes in the general economic state of the institutional unit itself: the producer provides insurance, financial intermediation, protection, guarantees, etc.

11. The changes may be temporary or permanent. For example, medical or education services may result in permanent changes in the condition of the consumers from which benefits may be derived over many years. In general, the changes may be presumed to be improvements, as services are produced at the demand of the consumers. The improvements usually become embodied in the persons of the consumers or the goods they own and are not separate entities that belong to the producer. Such improvements cannot be held in inventory by the producer or traded separately from their production.

12. A single process of production may provide services to a group of persons, or units, simultaneously. For example, groups of persons or goods belonging to different institutional units may be transported together in the same plane, ship, train or other vehicle. People may be instructed or entertained in groups by attending the same class, lecture or performance. Certain services are provided collectively to the community as a whole, or

large sections of the community: for example, the maintenance of law and order, and defence.

13. There is a group of industries generally classified as service industries that produce outputs that have many of the characteristics of goods, namely those industries concerned with the provision, storage, communication and dissemination of information, advice and entertainment in the broadest sense of those terms - the production of general or specialised information, news, consultancy reports, computer programs, movies, music, etc. The outputs of these industries, over which ownership rights may be established, are often stored on physical objects - paper, tapes, disks, etc. - that can be traded like ordinary goods. Whether characterised as goods or services, these products possess the essential common characteristic that they can be produced by one unit and supplied to another, thus making possible division of labour and the emergence of markets.

2. The production boundary

14. Given the general characteristics of the goods and services produced as outputs, it becomes possible to define production. A general definition of production is given first, followed by the rather more restricted definition that is used in the System.

a. The general production boundary

15. Economic production may be defined as an activity carried out under the control and responsibility of an institutional unit that uses inputs of labour, capital, and goods and services to produce outputs of goods or services. There must be an institutional unit that assumes responsibility for the process and owns any goods produced as outputs or is entitled to be paid, or otherwise compensated, for the services provided. A purely natural process without any human involvement or direction is not production in an economic sense. For example, the unmanaged growth of fish stocks in international waters is not production, whereas the activity of fish farming is production.

16. While production processes that produce goods can be identified without difficulty, it is not always so easy to distinguish the production of services from other activities that may be both important and beneficial. Activities that are not productive in an economic sense include basic human activities such as eating, drinking, sleeping, taking exercise, etc. that it is impossible for one person to obtain another person to perform instead. Paying someone else to take exercise is no way to keep fit. On the other hand, activities such as washing, preparing meals, caring for children, the sick or aged are all activities that can be provided by other units and therefore fall within the general production boundary. Many nouseholds employ paid domestic staff to carry out these activities for them.

b. The production boundary in the System

17. The production boundary in the System is more restricted than the general production boundary. For reasons explained below, production accounts are not compiled for household activities that produce domestic or personal services for own final consumption within the same household, except for services produced by employing paid domestic staff. Otherwise, the production boundary in the System is the same as the more general one given in the previous section.

18. Activities that fall within the production boundary of the System may therefore be summarised as follows:

(1) the production of all individual or collective goods or services that are supplied to units other than their producers, or intended to be so supplied, including the production of goods or services used up in the process of producing such goods or services;

(2) the own-account production of all goods that are retained by their producers for their own final consumption or gross capital formation;

(3) the own-account production of housing services by owner-occupiers and of domestic and personal services produced by employing paid domestic staff.

(i) Domestic and personal services produced for own final consumption within households

19. The own-account production of domestic and personal services by members of the household for their own final consumption has traditionally been excluded from measured production in national accounts and it is worth explaining briefly why this is so.

20. First, it is advisable to clarify what are the domestic and personal services for which no outputs, incomes and expenditures are imputed when produced by members of the same household:

(1) the cleaning, decoration and maintenance of the dwelling occupied by the household, including small repairs of a kind usually carried out by tenants as well as owners;

(2) the cleaning, servicing and repair of household durables or other goods, including vehicles used for household purposes;

(3) the preparation and serving of meals;

(4) the care, training and instruction of children;

(5) the care of sick, infirm or old people;

(6) the transportation of members of the household or their goods.

21. In most countries a considerable amount of labour is devoted to the production of these unpaid domestic and personal services, while their consumption makes an important contribution to economic welfare. However, national accounts serve a variety of analytical and policy purposes and are not compiled simply to produce indicators of welfare. The reasons for not imputing values for unpaid domestic or personal services produced within households may be summarised as follows:

(1) The own-account production of services within households is a completely self-contained activity with limited repercussions on the rest of the economy. The decision to produce a household service entails a simultaneous decision to consume that service. This is not true for goods. For example, if a household engages in the production of agricultural goods, it does not follow that it intends to consume them all. Once the crop has been harvested, the producer has a choice about how much to consume, how much to store for future consumption or production, and how much to offer for sale or barter on the market. Indeed, although it is customary to refer to the own-account production of goods, it is not possible to determine at the time the production takes place how much of it will eventually be consumed. For example, if an agricultural crop turns out to be better than expected, the household may dispose of some of it on the market even though it may have been originally intended all for own consumption. This kind of possibility is non-existent for services.

(2) As the vast majority of household domestic and personal services are not produced for the market, there are typically no market prices that can be satisfactorily used to value such services. It is, therefore, extremely difficult to estimate meaningful values not only for the outputs of the services but also the associated incomes and expenditures which can be used for purposes of economic analysis in conjunction with the monetary transactions which make up most of the entries in the accounts.

(3) Imputed values have a different economic significance from monetary values. The imputed incomes generated by the imputed production would be difficult to tax in practice. They would have to be spent on the same services with the same imputed values. However, if the imputed incomes were to be available in cash, the resulting expenditures might be quite different. For example, if a household member were offered the choice between producing services for own consumption and producing the same services for another household in return for cash remuneration equal to the imputed value, the paid employment would likely be preferred because of the greater range of consumption possibilities it

affords. Thus, imputing values for the own-account production of services would not only be very difficult, but would yield values which would not be equivalent to monetary values for analytic or policy purposes.

22. Thus, the reluctance of national accountants to impute values for the outputs, incomes and expenditures associated with the production and consumption of domestic and personal services within households is explained by a combination of factors, namely the relative isolation and independence of these activities from markets, the extreme difficulty of making economically meaningful estimates of their values, and the adverse effects it would have on the usefulness of the accounts for policy purposes and the analysis of markets and market disequilibria - the analysis of inflation, unemployment and so on. It could also have unacceptable consequences for labour force and employment statistics. According to International Labour Office (ILO) guidelines, economically active persons are persons engaged in production included within the boundary of production of the System. If that boundary were to be extended to include the production of own-account household services, virtually the whole adult population would be economically active and unemployment eliminated. In practice, it would be necessary to revert to the existing boundary of production in the System, if only to obtain meaningful employment statistics.

c. The production boundary within households

23. Although personal and domestic services produced for own consumption within households fall outside the boundary of production used in the System, it is nevertheless useful to give further guidance with respect to the treatment of certain kinds of household activities which may be particularly important in some developing countries.

(i) Own-account production of goods

24. The System includes all goods within the production boundary. At the time the production takes place it may often be undecided whether, or in what proportions, the goods produced are destined for the market or for own use. The following types of production intended for own consumption within households are therefore included:

(1) the production of agricultural products and their subsequent storage; the gathering of berries or other uncultivated crops; forestry; wood cutting and the collection of firewood; hunting and fishing;

(2) the production of other primary products such as mining salt; cutting peat; the supply of water; etc.

(3) the processing of agricultural products; the production of grain by threshing; the production of flour by milling; the curing of skins and the production of leather; the production and preservation of meat and fish products; the preservation of fruit by drying, bottling, etc.; the production of dairy products such as butter or cheese; the production of beer, wine, or spirits; the production of baskets or mats; etc.

(4) other kinds of processing such as weaving cloth; dress making and tailoring; the production of footwear; the production of pottery, utensils or durables; making furniture or furnishings; etc.

The storage of agricultural goods produced by households is included within the production boundary as an extension of the goods producing process. The supply of water is also considered a goods producing activity in this context. In principle, supplying water is a similar kind of activity to extracting and piping crude oil.

25. It is not feasible to draw up a complete, exhaustive list of all possible productive activities but the above list covers the most common types. When the amount of a good produced within households is believed to be quantitatively important in relation to the total supply of that good in a country, its production should be recorded. If the amount produced is unimportant, it is not worthwhile trying to estimate it in practice.

(ii) "Do-it-yourself" decoration, maintenance and small repairs

26. "Do-it-yourself" repairs and maintenance to consumer durables and dwellings carried out by members of the household constitute the own-account production of services and are therefore excluded from the production boundary of the System. The materials purchased are treated as final consumption expenditure.

27. In the case of dwellings, "do-it-yourself" activities cover decoration, maintenance and small repairs, including repairs to fittings, of types which are commonly carried out by tenants as well as by owners. On the other hand, more substantial repairs, such as replastering walls or repairing roofs, carried out by owners are essentially intermediate inputs into the production of housing services. However, the production of such repairs by an owner-occupier is only a secondary activity of the owner in his capacity as a producer of housing services. The production accounts for the two activities may be consolidated so that, in practice, the purchases of materials for repairs become intermediate expenditures incurred in the production of housing services. Major renovations or extensions to dwellings are fixed capital formation and recorded separately.

(iii) The use of consumption goods

28. In general, the use of goods within the household for the direct satisfaction of human needs or wants cannot be treated as production. This applies not only to materials or equipment purchased for use in leisure or recreational activities but also to foodstuffs purchased for the preparation of meals. The preparation of a meal is a service type activity and is treated as such in the System and in International Standard Industrial Classification (ISIC). It therefore falls outside the production boundary when the meal is prepared for own consumption within the household. The use of a durable good, such as vehicle, by persons or households for their own personal benefit or satisfaction is intrinsically a consumption activity and should not be treated as if it were an extension, or continuation, of production.

(iv) Services of owner-occupied dwellings

29. The production of housing services for their own final consumption by owner-occupiers has always been included within the production boundary in national accounts, although it constitutes an exception of the general exclusion of own-account service production. The ratio of owner-occupied to rented dwellings can vary significantly between countries and even over short periods of time within a single country, so that both international and intertemporal comparisons of the production and consumption of housing services could be distorted if no imputation were made for the value of own-account housing services. The imputed value of the income generated by such production is taxed in some countries.

d. Illegal production

30. Despite the obvious practical difficulties in obtaining data on illegal production, it is included within the production boundary of the System. There are two kinds of illegal production:

(1) the production of goods or services whose sale, distribution or possession is forbidden by law;

(2) production activities which are usually legal but which become illegal when carried out by unauthorised producers; e.g., unqualified medical practitioners.

31. Both kinds of production are included within the production boundary of the System provided they are genuine production processes whose outputs consist of goods or services for which there is an effective market demand. The units who purchase such outputs may not be involved in any kind of illegal activities other than the illegal transactions themselves. Transactions in which illegal goods or services are bought and sold need to be recorded not simply to obtain comprehensive measures of production and consumption but also to prevent errors appearing elsewhere in the accounts if the funds involved in

illegal transactions services are presumed to be used for other purposes. The incomes generated by illegal production may be disposed of quite legally, while conversely expenditures on illegal goods and services may be made out of funds obtained quite legally. The failure to record illegal transactions may lead to significant errors in the Financial Account and also the External Account of some countries.

32. Examples of activities which may be illegal but productive in an economic sense include the manufacture and distribution of narcotics, illegal transportation in the form of smuggling (often a form of own-account illegal production) and services such as prostitution or abortion.

33. Illegal production does not refer to the generation of externalities such as the discharge of pollutants. Externalities may result from production processes which are themselves quite legal. Externalities are created without the consent of the units affected, and no values are imputed for them in the System. Illegal production also does not refer to stolen output. The theft of legally produced output by employees or others needs to be clearly distinguished from illegally produced output which is sold to willing buyers on the market.

e. Concealed production and the underground economy

34. Certain activities may be both productive in an economic sense and also quite legal (provided certain standards or regulations are complied with) but deliberately concealed from public authorities for the following kinds of reasons:

(1) to avoid the payment of income, value added or other taxes;

(2) to avoid the payment of social security contributions;

(3) to avoid having to meet certain legal standards such as minimum wages, maximum hours, safety or health standards, etc.;

(4) to avoid complying with certain administrative procedures, such as completing statistical questionnaires or other administrative forms.

All such activities clearly fall within the production boundary of the System provided that they are genuine processes of production. Producers engaged on this type of production may be described as belonging to the "underground economy". The underground economy may account for a substantial proportion of the total output of certain industries - for example, construction or certain service industries where small enterprises predominate.

35. There may be no clear borderline between the underground economy and illegal production. For example, production which does not comply with certain safety, health or other standards could be described as illegal.

Similarly, the evasion of taxes is itself usually a criminal offence. However, it is not necessary for purposes of the System to try to fix the precise borderline between underground and illegal production as both are included within the production boundary in any case. It follows that transactions on unofficial markets which exist in parallel with official markets (e.g., for foreign exchange or goods subject to official price controls) must also be included in the accounts, whether or not such markets are actually legal or illegal.

36. Because certain kinds of producers try to conceal their activities from public authorities, it does not follow that they are not included in national accounts in practice. Many countries have had considerable success in compiling estimates of production which cover the underground economy as well as the ordinary economy. In some industries, such as agriculture or construction, it may be possible by using various kinds of surveys and the commodity flow method to make satisfactory estimates of the total output of industry without being able to identify or measure that part of it which is underground (or indeed illegal). Because the underground economy may account for a significant part of the total economy of some countries, it is particularly important to try to make estimates of total production which include it, even if it cannot always be separately identified as such.

C. The Measurement of Production

1. Introduction

37. In the System, the intermediate inputs are recorded and valued at the time they enter the production process, while outputs are recorded and valued as they emerge from the process. Intermediate inputs are normally valued at purchasers' prices and outputs at basic prices, or alternatively at producers' prices if basic prices are not available. The increase between the value of the intermediate inputs and the value of the outputs is the gross value added against which must be charged the consumption of fixed capital, taxes on production (less subsidies) and compensation of employees. The positive or negative balance remaining is the net operating surplus or mixed income. The definition, measurement and valuation of outputs and inputs is therefore fundamental to the System and is described in detail in the following sections.

2. Output

38. Goods and services are produced by processes of production. However, certain goods or services produced within an establishment, including services produced by ancillary activities, are used up again within the same accounting period by other processes carried out within the same establishment. Such goods and services, although produced within the establishment, do not leave the establishment and are therefore not counted as part of its output. Thus,

output is a concept that applies to a producer unit - an establishment or enterprise - rather than a process of production. Output has to be defined in the context of a production account, and production accounts are compiled for establishments or enterprises, and not for processes of production. Output may therefore be defined briefly as the goods or services that are produced within an establishment that become available for use outside that establishment. When an enterprise contains more than one establishment, the output of the enterprise is the sum of the outputs of its component establishments.

39. For simplicity, the output of most goods or services is recorded when their production is completed. However, when it takes a long time to produce a unit of output, it becomes necessary to recognise that output is being produced continuously and to record it as "work-in-progress". For example, the production of certain agricultural goods or large durable goods such as ships or buildings may take months or years to complete, in which case it would distort economic reality to treat the output as if it were all produced at the moment of time when the process of production happens to terminate. In any case, whenever a process of production, however long or short, extends over two or more accounting periods, it is necessary to calculate the work-in-progress completed within each of the periods in order to be able to measure the output produced each period.

40. Output in the form of finished goods or services is ready to be supplied or provided to other institutional units. However, work-in-progress consists of output which, by definition, is not complete and therefore is not yet in a state in which it is normally marketed. In due course, however, the work-in-progress is transformed into a finished product that is marketable.

41. Goods or services produced as outputs may be used in several different ways and by listing these uses it is possible to obtain a clearer indication of the coverage of output. Apart from certain service producers, such as financial intermediaries and wholesale and retail traders whose outputs have special characteristics, goods or services produced as outputs must be disposed of by their owners in one or more of the following ways during the period in which they are produced:

(1) they may be sold: (only goods or services sold at economically significant prices are included here: <<see paragraph 53>> below);

(2) they may be bartered in exchange for other goods, services or assets, provided to their employees as compensation in kind, or used for other payments in kind;

(3) they may enter the producer's inventories prior to their eventual sale, barter or other use: incomplete outputs enter the producer's inventories in the form of additions to work-in-progress;

(4) they may be supplied to another establishment belonging to the same enterprise for use as intermediate inputs into the latter's production;

(5) they may be retained by their owners for own final consumption or own gross fixed capital formation;

(6) they may be supplied free, or sold at prices that are not economically significant <<see paragraph 53>>, to other institutional units, either individually or collectively.

42. The entire output of an establishment or enterprise must be used in one or other of the above ways. For example, some of the crop produced by a farmer may be sold or bartered; some may be used for final consumption by members of the farmer's household; while the remainder may be put into inventory for future sale or use.

43. In practice, some of the goods sold or otherwise used within any given accounting period may have been withdrawn from inventories of goods produced in previous periods. Thus, in the normal situation in which the available accounting data on sales or other uses refer to the total sales or other uses in that period, it is necessary to deduct the value of such withdrawals from the value of total sales or uses to obtain the output of the period in question. It is therefore necessary to record the value of changes in inventories, i.e., entries less withdrawals, and not simply additions to inventories. This leads to the well known accounting identity:

the value of output	=	the value of total sales or other uses of goods or services produced as outputs	+	the value of changes in the inventories of goods produced as outputs

a. Market and non-market output

44. A fundamental distinction is that between market and non-market output.

(i) Market output

45. Market output is output that is sold or otherwise disposed of on the market, or intended for sale or disposal on the market, excluding output sold at prices that are not economically significant <<see paragraph 53>>. Apart from certain service industries for which special conventions are adopted, the value of the market output of a producer is given by the sum of the values of the following items for the period in question:

(1) the total value of goods and services sold (at economically significant prices);

(2) the total value of goods or services bartered;

(3) the total value of goods or services used for payments in kind, including compensation in kind;

(4) the total value of goods or services supplied by one establishment to another belonging to the same market enterprise to be used as intermediate inputs;

(5) the value of changes in inventories of finished goods and work-in-progress intended for one or other of the above uses.

Items (1) to (4) refer to values of all goods and services sold or otherwise disposed of, whether produced in the current period or previous periods.

(ii) Non-market output

46. Non-market is output that is not produced for sale or other market use. It consists of goods and services produced for own final use or provided free, or at prices that are not economically significant, to other institutional units, either individually or collectively. The value of the non-market output of a producer is given by the sum of the values of the following items for the period in question.

(1) the value of goods or services produced for own final consumption or own gross fixed capital formation;

(2) the value of goods or services supplied free, or at prices that are not economically significant <<see paragraph 53>>, to other institutional units, either individually or collectively;

(3) the value of goods or services supplied by one non-market establishment to another;

(4) the value of changes in inventories of finished goods and work-in-progress intended for one or other of the above uses.

47. In practice, items (1) and (2) refer to quite different uses and it is convenient to consider them separately.

(iii) Output produced for own final use

48. This type of non-market output consists of goods or services that are retained for their own final use by the owners of the enterprises in which they are produced. The output of domestic and personal services produced within households for consumption by members of the same households is not included for reasons already given, although housing services produced for own

consumption by owner-occupiers and services produced on own account by employing paid domestic staff are included under this heading.

49. As corporations have no final consumption, goods or services retained for own final consumption can only be produced by unincorporated enterprises. They include, for example, agricultural products retained for own final consumption by farmers or housing services produced by owner-occupiers.

50. Goods or services used for own gross fixed capital formation can be produced by corporations or unincorporated enterprises. They include, for example, the special machine tools produced for their own use by engineering enterprises, or dwellings, or extensions to dwellings, produced by households. A wide range of construction activities may be undertaken for the purpose of own gross fixed capital formation in rural areas in some countries, including communal construction activities undertaken by groups of households.

51. Goods or services produced for own final use are valued at the basic prices of similar products sold on the market or by their costs of production if no suitable basic prices are available.

(iv) Output provided free, or at prices that are not economically significant

52. The second type of non-market output consists of goods and individual or collective services that are supplied free, or at prices that are not economically significant, to other institutional units or the community as a whole. Such output may be produced for two reasons.

(1) It may be technically impossible to make individuals pay for collective services because their consumption cannot be monitored or controlled. The pricing mechanism cannot be used when transactions costs are too high and there is market failure. The production of such services has to be organised collectively by government units and financed out of funds other than receipts from sales, namely taxation or other government incomes.

(2) Government units and non-profit institutions (NPIs) may also produce and supply goods or services to individual households for which they could charge but choose not to do so as a matter of social or economic policy. The most common examples are the provision of education or health services, free or at prices that are not economically significant, although other kinds of goods and services may also be supplied.

53. A price is said to be not economically significant when it has little or no influence on how much the government unit or NPI is prepared to supply and is expected to have only a marginal influence on the quantities demanded. It is thus a price that is not quantitatively significant from the point of view of either supply or demand. Such prices are likely to be charged in order to

raise some revenue or achieve some reduction in the excess demand that may occur when services are provided completely free, but they are not intended to eliminate such excess demand. Once a decision has been taken on administrative, social or political grounds about the total amount of a particular non-market good or service to be supplied, its price is deliberately fixed well below the equilibrium price that would clear the market. The difference between a price that is not economically significant and a zero price is therefore a matter of degree. The price merely deters those units whose demands are the least pressing without greatly reducing the total level of demand.

54. As prices that are not economically significant may reflect neither relative production costs nor relative consumer preferences, they do not provide a suitable basis for valuing the outputs of goods or services concerned. The non-market output of goods or services sold at these prices is therefore valued in the same way as goods or services provided free, namely by their costs of production. Part of this output is purchased by households, the remainder constituting final consumption expenditures by government units or NPIs.

b. Market and non-market producers

55. A market producer is an establishment or enterprise most or all of whose output is market. It is perfectly possible for market producers, both small unincorporated enterprises and large corporations, to have some non-market output in the form of production for own final consumption or gross fixed capital formation.

56. A non-market producer is an establishment or enterprise most or all of whose output is non-market. There are two kinds of non-market producers corresponding to the two types of non-market output. The first type consists of unincorporated enterprises owned by households most or all of whose output is intended for final consumption or gross fixed capital formation by those households or enterprises: for example, owner-occupiers or subsistence farmers who sell only a small fraction of their output. The second type of non-market producer consists of establishments owned by government units or NPIs that supply goods or services free, or at prices that are not economically significant, to households or the community as a whole. These producers may also have some sales of secondary market output whose prices are intended to cover their costs or earn a surplus: for example, sales of reproductions by non-market museums.

D. The Measurement of Market Output

57. Five uses of market output were distinguished in <<paragraph 45>> above. The ways in which these uses should be recorded are described in the following sections.

1. The recording of sales

58. The times at which sales are to be recorded are when the receivables and payables are created: that is, when the ownership of the goods passes from the producer to the purchaser or when the services are provided to the purchaser. The goods or services are valued at the basic prices at which they are sold. If valuation at basic prices is not feasible, they may be valued at producers' prices instead. The values of sales are determined by the amounts receivable and payable by the producers and purchasers, which do not always coincide with the amounts actually received and paid. When payments are made in advance or in arrears, the values of sales should not include any interest or other charges incurred by the producer or purchaser. Such charges are recorded as separate transactions.

2. The recording of barter

59. Barter occurs when goods and services are exchanged for other goods, services or assets. The value of goods or services bartered should be recorded when the ownership of the goods is transferred or the services are provided: they should be valued at the basic prices that would have been received if they had been sold.

3. The recording of compensation in kind or other payments in kind

60. Goods or services provided to employees as compensation in kind, or used for other payments in kind, should be recorded when the ownership of the goods is transferred or the services are provided. They should be valued at the basic prices that would have been received if they had been sold.

4. Changes in inventories of outputs

a. Introduction

61. The treatment of inventories of finished goods is considered first, followed by the treatment of work-in-progress. The principles governing the recording of changes in inventories and work-in-progress are the same for both market and non-market output.

62. The basic principle underlying the measurement of changes in inventories is that output should be recorded at the time it is produced and valued at the same prices whether it is immediately sold or otherwise used or entered into inventories for sale or use later. No output is recorded when goods produced previously are withdrawn from inventories and sold or otherwise used. It follows that entries into inventories must be valued at the basic prices prevailing at the time of entry, while withdrawals must be valued at the prices at which they are then sold. In this way, the value of the sales or

other uses of goods produced previously is cancelled out by the (negative) value for withdrawals from inventories. This method of valuing changing inventories, which may be described as the "perpetual inventory method" or PIM, is not always easy to implement in practice, however, and it sometimes leads to results which may be counter intuitive. A more detailed explanation of the PIM, and its properties, is given in <annex IV, Capital Stock and Consumption of Fixed Capital>. The purpose of the present section is only to explain in general terms how changes in inventories are recorded and valued in the System.

63. When prices are stable, the measurement of changes in inventories is relatively simple. However, when there is inflation, significant price increases may occur while goods are held in inventory. Holding gains accruing on goods held in inventory after they have been produced must not be included in the value of output. The PIM ensures their exclusion by valuing goods withdrawn from inventory at the prices prevailing at the time they are withdrawn and not at the prices at which they entered, or their "historic costs". This method of valuation can lead to much lower figures for both output and profits in times of inflation as compared with business accounting methods which use historic costs.

b. Output, sales and changes in inventories

64. It follows from the general principles outlined in the previous section that:

(1) goods entering inventory are valued at the basic prices prevailing at that time: that is, at the prices at which they could have been sold when first produced;

(2) goods withdrawn from inventory are valued at the basic prices prevailing at that time: that is, at the prices at which they can then be sold.

65. The total value of the changes in inventories of finished goods recorded within a specified accounting period is then given by:

the sum of the values of all goods entering inventory

less the sum of the values of all goods withdrawn from inventory.

less the value of any current losses of goods held in inventory.

66. Goods held in inventory are subject to deterioration through the passage of time and are at risk from theft or accidental damage. Losses due to deterioration, theft and normal rates of accidental damage reduce the value of the total change in inventories, and hence output.

67. It follows from the valuation method used that, when prices are changing, goods entering and leaving inventory at different times are valued at different prices, even within the same accounting period (as also are goods sold at different times). This requires all entries to, and withdrawals from, inventories to be recorded continuously as they occur, and helps explain the complexity of the PIM. Assuming that sales and other uses are also appropriately recorded at the prices at which they actually occur and there are no changes in work-in-progress, the following identity must hold for goods or services produced for sale or other use:

the value of output	=	the value of sales	+ other uses	+ the value of changes in inventories

This identity holds whether the goods are all sold or otherwise used within the same accounting period in which they are produced, or whether some goods are sold or used in different periods.

(i) Storage services

68. For simplicity, the above presentation of the recording of changes in inventories has ignored the fact that inventories of goods have to be physically stored somewhere. Many goods have to be stored in a properly controlled environment and the activity of storage can become an important process of production in its own right whereby goods are "transported" from one point of time to another. In economics, it is generally recognised that the same goods available at different times, or locations, may be qualitatively different from each other and command different prices for this reason.

69. When goods are first produced, they may be held in store for a time in the expectation that they may be sold, exchanged or used more advantageously in the future. In these circumstances, storage can be regarded as an extension of the production process over time. The storage services become incorporated in the goods, thereby increasing their value while being held in store. Thus, in principle, the values of additions to inventories should include not only the values of the goods at the time they are stored but also the value of the additional output produced while the goods are held in store. The measurement of storage is considered in more detail in a later section.

c. Approximate measures of changes in inventories

70. As the PIM requires entries to, and withdrawals from, inventories to be recorded and valued continuously, it may be very difficult to obtain the requisite data, although it may become somewhat easier in the course of time as the development of micro-computers leads to improved methods of inventory management and control. In many countries, however, data on changes in inventories are among the least reliable information available and it is

necessary to consider whether satisfactory approximations can be used which require less data.

71. One special case of some interest occurs when output prices remain constant over time. In this case, all entries to and withdrawals from inventories are valued at the same prices, so that the cumulative value of entries less withdrawals simplifies to the difference between the values of the inventories recorded in the opening and closing balance sheets. In this case, information on actual inventory movements between the beginning and end of the accounting period becomes superfluous.

72. This suggests that even when prices are changing a good approximation to the PIM may be obtained by taking the difference between the quantities of goods held in inventory at the beginning and the end of the accounting period and valuing this difference at the average prices prevailing within the period. This method, which may be described as the "quantity" measure, is widely used in practice and is sometimes mistakenly considered to be the theoretically appropriate measure under all circumstances. The quantity measure will be the same, or virtually the same, as the PIM measure not only when prices are constant but also when the quantities of goods held in inventory rise or fall at a steady pace throughout the period. Conversely, the conditions under which the quantity measure may provide only a poor approximation to the PIM are when prices are rising or falling and when inventory levels fluctuate within the accounting period. Unfortunately, there are several important industries, including agriculture, in which inventories normally fluctuate because of seasonal variations either in the sequence of outputs produced or in the pattern of demand. Approximate measures of PIM inventory changes may be subject to considerable margins of error in such cases.

d. Changes in inventories in business accounts

73. The value of output in business accounts is also usually derived by adding the value of changes in inventories of outputs to the value of the sales. However, the normal practice in business accounting is to value goods held in (and withdrawn from) inventory at the price at which they were recorded as entering (i.e., "at historic cost") if this price is lower than the current price. The intention is to value inventories prudently for balance sheet purposes, but it may lead to measures of profit which are by no means prudent in inflationary conditions. Under historic cost accounting, a good withdrawn from inventory is liable to be valued at a lower price than that at which it is sold so that the value of output includes the value of the holding gain which accrues between the time of production and time of sale. As a result, the holding gain is not separated from the operating surplus on production under historic cost accounting. Composite measure of profit that combine holding gains with the operating surplus may be useful for certain purposes provided that the composite profit measure is not presented, or interpreted, as if it referred to the operating surplus only, i.e., the profit arising out of production. Unfortunately, the distinction between these two different components of historic cost profits is frequently neither made nor

appreciated. and may even be deliberately blurred in order to make the production activities of an enterprise appear more profitable than they are. In periods of high inflation, profit as recorded in business accounts is likely to exceed the operating surplus recorded in economic accounts by a considerable margin.

74. Although it is not proposed to go into great detail about business accounting practices in the present context, it is useful to add some further points for clarification. When goods withdrawn from inventory are valued at historic costs in business accounts, it is necessary to know, or assume, the order in which the goods are withdrawn. The most common assumption is FIFO, or first-in-first-out, which implies goods are withdrawn in the same order as they entered. For example, if goods are held in inventory for three months on average the combination of FIFO with historic cost accounting during inflation implies that the price of each unit sold will include a three months holding gain. As business accountants recognise that this may be undesirable for many purposes, an alternative assumption which has found increasing favour is LIFO, or last-in-first-out, which implies that a good withdrawn from inventory is the last one which entered. This implies that withdrawals are valued at current prices as in the SNA, provided that the level of inventory is not depleted. The provision is important because, under LIFO, the goods which remain in inventory are those which are assumed to have been there for the longest periods of time. If inventories are eventually run down those assumed to have been there for a very long time start to be withdrawn and may be valued at very low prices indeed when historic costs are used. Thus, even under LIFO substantial holding gains may be recorded if inventories are greatly diminished. Another method used in business accounting is to value goods withdrawn from inventory at the weighted average of the prices at which they entered. This method values withdrawals at prices between those used for FIFO and LIFO. Finally, in situations of very high inflation, the use of NIFO has been proposed, namely, next-in-first-out. This implies valuing goods withdrawn from inventory at the prices expected to prevail at some point in the near future.

75. Other, and more sophisticated, ways of valuing changes in inventories are, of course, also used in business accounts, especially in accounts drawn up for purposes of internal management as distinct from financial reporting. The methods used for management accounting are often very similar to, and possibly identical with, the PIM used in the SNA. Because so many different methods are liable to be used in business accounts, it is impossible to suggest algorithms, or rules of thumb, which would be generally applicable for purposes of transforming data on inventory changes in business accounts to the data required by the System. Each case has to be treated individually depending upon the precise way in which the business accounts have been drawn up.

e. Work-in-progress

76. When the process of production takes a long time to complete, output must be recognised as being produced continuously as work-in-progress. As the process of production continues, intermediate inputs are continually being consumed so that it is necessary to record some corresponding output to avoid meaningless figures for value added being obtained by recording the inputs and outputs as if they took place at different times, or even in different accounting periods. Work-in-progress is essentially incomplete output that is not yet marketable: that is, output that is not sufficiently processed to be in a state in which it can easily be supplied or sold to other institutional units. It is essential to record such output whenever the process of production is not completed within a single accounting period so that work-in-progress is carried forward from one period to the next. In this case, the current value of the work-in-progress completed up to the end of the first period is also recorded in the balance sheet drawn up at the end of the period that also serves as the opening balance sheet for the next period.

77. Work-in-progress may need to be recorded in any industry, including service industries such as the production of movies, depending upon the length of time it takes to produce a unit of output. It is particularly important in industries with long gestation periods, such as certain types of agricultural production or durable producers' goods production, where the period of production may extend over several years.

78. Work-in-progress is treated in the System as one component of inventories of outputs held by producers. However, the borderline between inventories of partially completed durable goods, such as bridges, tunnels, dams or other very large structures, and as gross fixed capital formation may not always be clear. Gross fixed capital formation is undertaken by users of the goods so that gross fixed capital formation cannot be recorded until the ownership of the goods is transferred from the producer to the user. This transfer does not usually occur until the process of production is completed. However, in the case of buildings or structures for which a contract of sale has been concluded in advance, the transfer of ownership may be deemed to occur in stages as value is put in place. Such transfer of ownership may actually take place legally. In such cases, stage payments made by the purchaser can often be used to approximate the value of the gross fixed capital formation although stage payments may sometimes be made in advance or in arrears of the completion of the stage, in which case short-term credits are also extended from the purchaser to the producer, or vice versa. In the absence of a contract of sale, the output produced must be treated as additions to the producer's inventories, i.e., as work-in-progress, however large the partially completed structure may be.

79. Additions to, and withdrawals from, work-in-progress are treated in the accounts in the same way as entries to, and withdrawals from, inventories of finished goods. They must be recorded at the times they take place and at the basic prices prevailing at those times. However, further explanation is

needed of the time of recording and valuation in view of the special characteristics of work-in-progress.

(i) The time of recording of work-in-progress

80. Additions to work-in-progress take place continuously as work proceeds. Within any given accounting period, such as a year or a quarter, it is therefore necessary to record the cumulative amount of work-in-progress produced within that period. Until a sale is ultimately recorded, the addition to work-in-progress is the only component of output recorded each period. When the production process is terminated, the whole of the work-in-progress accumulated up to that point is effectively transformed into an inventory of finished product ready for delivery or sale. When the sale takes place, the value of the sale must be cancelled out by a withdrawal from inventory of equal value so that only the additions to work-in-progress previously recorded while production was taking place remain as measures of output. In this way, the output is distributed over the entire period of production.

(ii) The valuation of work-in-progress

81. Assuming the basic price of the finished product remains unchanged over the periods during which it is being produced, the value of the addition to work-in-progress in a given period is obtained by multiplying the basic price by the share of the total production costs incurred during that period. In other words, the value of the final output is distributed over the various periods during which production takes place in proportion to the costs incurred.

82. It may be necessary to estimate the value of additions to work-in-progress in successive periods in advance of knowing what basic price will eventually be realised. In this situation, provisional estimates of the value of additions to work-in-progress should be made on the basis of the total production costs incurred each period plus a mark-up for expected operating surplus or estimated mixed income. Such estimates can be revised subsequently when the actual sale price, and hence actual operating surplus or mixed income, become known.

83. The situation is more complicated when the expected sales price is itself continually being revised upwards during the production period as a result of general inflation. In this case, the calculation of the addition to work-in-progress each period should be based on the expected sale price at that point of time. This implies that additions to work-in-progress in successive accounting periods may have to be calculated on the basis of progressively higher expected sales prices when there is general inflation. Despite the practical difficulties, this procedure has to be followed in order to match the values of inputs and output each period and to obtain economically meaningful measures of value added. This procedure is also

required in order to ensure that additions to work-in-progress are valued in accordance with the general rule that additions to inventories are valued at the basic prices (actual or estimated) prevailing at the times they occur.

5. Deliveries between establishments belonging to the same enterprise

84. As explained in <<chapter V, Establishments and Industries, paragraph >>, an establishment is a production unit situated in a single location in which a single productive activity is carried out or in which most of its value added is produced by a single activity. It may coincide with an enterprise, or be part of an enterprise, in which case it may be producing goods or services for the use of other establishments belonging to the same enterprise.

85. Goods or services produced and consumed within the same accounting period and within the same establishment are not separately identified and therefore not recorded as part of the output or intermediate consumption of that establishment. On the other hand, goods which are produced by an establishment and remain in inventory at the end of the period in which they are produced must be included in output, whatever their subsequent use. If they are intended to be used within the establishment subsequently, they should be recorded as work-in-progress: this implies that they are not recorded as intermediate consumption in the period in which they are withdrawn from inventories.

86. Goods and services which one establishment provides to a different establishment belonging to the same enterprise are counted as part of the output of the producing establishment. Such goods and services may be used for intermediate consumption by the receiving establishment, but they could also be used for gross fixed capital formation. The goods and services should be valued by the producing establishment at current basic prices; the receiving establishment should value them at the same prices plus any additional transportation costs paid to third parties. The use of artificial transfer prices employed for internal accounting purposes within the enterprise should be avoided, if possible.

87. The accounts and tables of the System include production accounts for groups of enterprises and groups of establishments, i.e., for both sectors and industries. In order to ensure that the total output and total intermediate inputs of an enterprise are the same as the corresponding totals for the establishments which make up that enterprise, the enterprise totals must include any inter-establishment deliveries of goods and services.

E. The Measurement of Non-market Output

1. Introduction

88. As explained in section C.2.a.(i), non-market output is output that is not produced for sale or other market use. The ways in which the different kinds of non-market output are measured are explained in the following sections.

2. Output produced for own final consumption or own gross fixed capital formation

89. Goods and services produced for own final use are included within the production boundary of the System except for domestic and personal services produced by members of households for consumption by themselves or other members of the same household. Goods and services produced for own use should be recorded as their production takes place.

90. The goods and services should be valued at the basic prices at which they could be sold if offered for sale on the market. In order to value them in this way, goods or services of the same kind must actually be bought and sold in sufficient quantities on the market to enable reliable market prices to be calculated which can be used for valuation purposes. When reliable market prices cannot be obtained, a second best procedure must be used in which the value of the output of the goods or services produced for own use is deemed to be equal to the sum of their costs of production: that is, as the sum of:

- intermediate consumption
- compensation of employees
- consumption of fixed capital
- any taxes (less subsidies) incurred during the process of production.

91. It will usually be necessary to value the output of own-account construction on the basis of costs as it is likely to be difficult to make a direct valuation of an individual and specific construction project that is not offered for sale. When the construction is undertaken for itself by a business enterprise, the requisite information on costs may be easily ascertained, but not in the case of the construction of dwellings by households or communal construction for the benefit of the community undertaken by informal associations or groups of households. Most of the inputs into communal construction projects, including labour inputs, are likely to be provided free so that even the valuation of the inputs may pose problems. As unpaid labour may account for a large part of the inputs it is important to make some estimate of its value using wage rates paid for similar kinds of work on local labour markets. While it may be difficult to find an

appropriate rate, it is likely to be less difficult than trying to make a direct valuation of a specific construction project itself.

a. Output of services for own consumption

92. In practice, the recording of the production of services for own consumption is less common than for goods. Most of the services produced for own consumption by an enterprise (e.g., transportation, storage, maintenance, etc.) are produced by ancillary activities and are thus not separately identified or recorded either under the output or the intermediate consumption of the establishment or the enterprise to which it belongs. Domestic or personal services produced by members of households for each other are, by convention, treated as falling outside the production boundary of the System. There are, however, two specific categories of services produced for own final consumption whose output must be valued and recorded.

(i) Services produced by employing paid domestic servants

93. Paid domestic servants, cooks, gardeners, chauffeurs, etc. are formally treated as employees of an unincorporated enterprise that is owned and managed by the head of the household. The services produced are therefore consumed by the same unit which produces them and they constitute a form of own-account production. By convention, any intermediate costs and consumption of fixed capital incurred in the production of the domestic services are ignored and the value of the output produced is deemed to be equal to the compensation of employees paid, including any compensation in kind such as food or accommodation. The same value is therefore recorded under household final consumption expenditures.

(ii) Services of owner-occupied dwellings

94. Heads of household who own the dwellings which the households occupy are formally treated as owners of unincorporated enterprises that produce housing services consumed by those same households. As well organised markets for rented housing exist in most countries, the output of own-account housing services can be valued using the prices of the same kinds of services sold on the market in line with the general valuation rules adopted for goods or services produced on own account. In other words, the output of the housing services produced by owner-occupiers is valued at the estimated rental that a tenant would pay for the same accommodation, taking into account factors such as location, neighbourhood amenities, etc. as well as the size and quality of the dwelling itself. The same figure is recorded under household final consumption expenditures.

3. Non-market output of government and NPIs

95. As explained in <<paragraph 52>> above, government units or NPIs may engage in non-market production because of market failure or as a matter of deliberate economic or social policy. Such output is recorded at the time it is produced, which is also the time of delivery in the case of non-market services. In general, however, non-market output cannot easily be valued using market prices in the same way as goods or services produced for own final consumption or own capital formation that are also produced in large quantities for sale on the market. There are no markets for collective services such as public administration and defence, but even in the case of education, health or other services provided to individual households, suitable market prices may not be available. It is not uncommon for similar kinds of services to be produced on a market basis and sold alongside the non-market services but there are usually important differences between market and non-market services in the types and quality of services provided. In most cases, it is not possible to find enough market services that are sufficiently similar to the corresponding non-market services to enable their prices to be used to value the latter, especially when the non-market services are produced in very large quantities.

96. For these reasons, and also to ensure that all non-market services produced by government units and NPIs are valued consistently with each other, they are all valued in the System by the sum of the costs incurred in their production: that is, as the sum of:

- intermediate consumption
- compensation of employees
- consumption of fixed capital
- taxes, less subsidies, on production
- net operating surplus on services of own buildings

The net operating surplus on the production of non-market goods or services is assumed always to be zero, except for the notional net operating surplus on the services of buildings owned by government units or NPIs as explained in the following paragraphs.

a. The valuation of the consumption of building services produced on own-account by government units

97. Government units may own or rent the buildings they occupy and use. When the buildings are rented, the rentals paid are one of the components of the intermediate consumption whose costs enter into the calculation of the value of the non-market output produced by government establishments. When the buildings are owned by government, the building services produced for own consumption by government should be similarly valued at the rentals that would be paid if they were rented in order to obtain estimates of the value of intermediate consumption of government that are invariant to whether its buildings happen to be owned or rented. In most countries, well organised

markets exist for rented office or business accommodation that make it feasible to obtain realistic estimates of the market rentals that would be paid on government owned buildings.

98. Assuming the value of the consumption of building services produced on own account is estimated by the market rentals, the costs of producing such services must not be double counted when valuing the non-market output of government producers. These consist of wage and other costs incurred on maintaining, repairing and cleaning the buildings, capital consumption on the buildings, any property or other taxes paid, etc. These costs must obviously not be included in addition to the estimated market rentals when building up the value of non-market output from its costs of production. In effect, therefore, the use of market rentals instead of costs changes the value of the non-market output of government producers by the difference between the rentals and the total costs of the own-account production of the building services. This difference can be interpreted as a notional net operating surplus on such production, which could be positive or negative. Such an implicit operating surplus is always created whenever the value of the output from own-account production is estimated by the basic price of the output.

99. If it is not feasible to obtain realistic and reliable estimates of the market rentals that would be paid on government owned buildings, it is necessary to estimate the notional net operating directly and add it to the costs of producing the services when calculating the value of the non-market output of the government producers concerned. To be commercially viable in the long run, the net operating surplus accruing to a market producer from the renting of buildings must be sufficient to cover at least the actual or imputed rent on the land on which the buildings are located and also the actual or imputed interest costs on the use of borrowed or own funds: that is capital costs in the form of interest paid or interest foregone. When market rentals are not available, therefore, the estimated value of the rent on land plus capital costs should be used as estimates of the notional net operating surplus to be added to the costs of production. The capital costs should be calculated by multiplying the estimated value of the buildings by an appropriate real, and not nominal, rate of interest when these diverge because of inflation.

b. The valuation of the consumption of building services produced on own-account by NPIs

100. The consumption of building services produced on own-account by NPIs is measured in the same way as for government units, as just described.

c. The coverage of non-market output

101. Government units and NPIs may be engaged in both market and non-market production. Whenever possible, separate establishments should be distinguished for these two types of activities, but this may not always be

feasible. Thus, a non-market establishment may have some receipts from sales of market output produced by a secondary activity: for example, sales of reproductions by a non-market museum. However, even though a non-market establishment may have sales receipts, its total output including both its market and its non-market output, is still valued by the production costs. The value of its market output is given by its receipts from sales of market products, the value of its non-market output being obtained residually as the difference between the values of its total output and its market output. The value of its receipts from the sale of non-market goods or services at prices that are not economically significant remain as part of the value of its non-market output.

F. The Output of Particular Industries

1. Introduction

102. The general rules governing the recording and valuation of market and non-market output are not sufficiently detailed to determine the way in which the output of certain kinds of industries, mostly service industries, such as wholesale and retail trade and financial intermediaries, are measured. The following sections therefore provide further information about the measurement of the output of a number of specific industries. For convenience, the industries concerned are given in the same order as they appear in the ISIC.

2. Agriculture, forestry and fishing

103. First, it should be noted that the growth of crops, trees, livestock or fish which is organised, managed and controlled by institutional units constitutes a process of production in an economic sense. Growth is not to be construed as a purely natural process which lies outside the production boundary. Most processes of production merely exploit natural forces for economic purposes: for example, hydroelectricity plants exploit rainfall and gravity to produce electricity.

104. The measurement of the output of agriculture, forestry and fishing is complicated by the fact the process of production may extend over many months, or even years. Growing crops, standing timber, and stocks of fish or animals reared for purposes of food have to be treated as work-in-progress - that is, as output which is not yet sufficiently processed to be in a form which is ready to be marketed. When the crops are harvested, the trees felled, or the animals killed, the process of production is completed and the work-in-progress is transformed into inventories of finished products ready for sale or other use. Conceptually, therefore, output in agriculture, forestry and fishing can be measured in exactly the same way as other types of production which take a long time to complete, i.e., by sales plus changes in inventories including additions to work-in-progress. Output should be recorded as being produced continuously over the entire period of production and not simply at

the moment of time when the process is completed, i.e., when the crops are harvested or animals slaughtered.

105. Assume the process of production takes several periods (months, quarters, or years, as the case may be) to complete. The value of the output produced in each period can then be measured as work-in-progress by distributing the value of the finished agricultural products (harvested crops, slaughtered animals, etc.) in proportion to the costs incurred each period. For this purpose, farms that are corporate enterprises need to be distinguished from those that are unincorporated (presumably the great majority of farms in most countries). The output of corporate farms can be distributed in proportion to the actual costs incurred each period, including compensation of employees. However, in the case of unincorporated farms, unpaid labour inputs provided by the owner(s) may account for much of the real costs incurred. The allocation of the finished output of these farms may be accomplished as follows. First, actual costs (expenditures on seed, fuels, etc.) are allocated to the periods in which they were incurred. Second, the remaining part of the value of the finished output, i.e., the realised mixed income - is distributed in proportion to the unpaid hours worked by the owner(s). For this purpose, rough indicators of the relative amounts of work done in different periods may be sufficient. The value of the finished products is given by the sum of the values of the following three items:

(1) finished products sold or bartered valued at current basic prices;

(2) entries of finished products into inventories, less withdrawals, valued at current basic prices;

(3) finished products consumed by their producer valued at current basic prices.

106. When the value of the finished products is distributed as work-in-progress it is essential also to record the reduction in work-in-progress which takes place at the moment when the production is completed and the work-in-progress is transformed into finished agricultural products. Otherwise, output would be recorded twice: first as additions to work-in-progress and second as sales plus changes in inventories of finished products. The negative figure for the reduction in work-in-progress cancels out the value of sales plus changes in inventories of finished products so that no output is recorded at the moment when the production process is terminated, all of it having been previously recorded as work-in-progress during the period of production.

107. If the entire production process is completed within a single accounting period, such as a year, it may be superfluous and unnecessary to distribute the output as work-in-progress in the way described above. However, if the accounting period ends before the process is completed, or if accounts have to be compiled for sub-periods such as quarters, the total value of the finished products has to be distributed as work-in-progress. It must be remembered that the corresponding inputs into the same production process are in fact

distributed over time and recorded in the different periods or sub-periods. Thus, if outputs are not similarly distributed as work-in-progress, inputs are recorded without outputs, in which case economically meaningless figures are liable to be recorded for value added, operating surplus and balance of primary incomes. Moreover, it may be necessary to record work-in-progress, even when the production process is completed within a single accounting period, in order to obtain an appropriate match between the values of inputs and outputs when the general price level is rising strongly within the accounting period.

a. The estimation of work-in-progress in advance

108. In agriculture, as in other industries, it may sometimes be necessary to estimate the value of work-in-progress in advance of the production process being completed and the value of the finished products being known, although most accounts are compiled long after the production processes to which they relate are finished. It is recommended therefore that work-in-progress be calculated provisionally on the basis of the actual costs incurred, plus a mark-up for the estimated operating surplus or an estimate of mixed income. The estimate of mixed income may be made by distributing the expected mixed income in proportion to the volume of unpaid labour. As soon as the actual value of the finished products becomes known, the provisional estimates should be replaced by those obtained by distributing the actual value of the finished produced in the ways described earlier. If a growing crop, i.e., work-in-progress, is badly damaged or destroyed prior to the harvest, the earlier provisional estimates of work-in-progress obviously may have to be revised downwards, to zero if necessary, even before the production is completed.

109 There may be circumstances in which the uncertainties attaching to the estimation of work-in-progress in advance of the harvest are so great that no useful analytic or policy purpose is served by compiling such estimates. However, this does not prevent useful estimates being compiled in many other situations in which the margin of uncertainty is much less. In any case, it is necessary to specify the appropriate way in which the output of agricultural products is to be recorded and valued when complete information is available. Accounts are essentially ex post records, even though initial estimates made in advance are inevitably subject to error.

3. Machinery, equipment and construction

110. The production of large durable goods such as ships, heavy machinery, buildings and other structures may take several months or years to complete. The output from such production must, therefore, usually be measured by work-in-progress and cannot be recorded simply at the moment of time when the process of production is completed. The way in which work-in-progress is to be recorded and valued has been explained in earlier sections of this chapter, including the preceding section on agricultural output.

111. It is worth noting, however, that when a contract of sale is agreed in advance for the construction of a building or other structure extending over several accounting periods, the output produced each period is treated as being sold to the purchaser at the end of the period: i.e., as a sale rather than work-in-progress. In effect, the output produced by the construction contractor is treated as being sold to the purchaser in stages as the latter takes legal possession of the output. It is therefore recorded as gross fixed capital formation by the purchaser and not as work-in-progress. When the contract calls for stage payments, the value of the output may often be approximated by the value of stage payments made each period. In the absence of a contract of sale, however, the output produced each period must be recorded as work-in-progress and not as a sale, just as a finished durable good, such as an aircraft or house, which is not yet sold must be recorded under increases in the producer's inventories and not as gross fixed capital formation.

4. Transportation and storage

a. Transportation

112. The output of transportation is measured by the value of the amounts receivable for transporting goods or persons. In economics a good in one location is recognised as being a different quality from the same good in another location, so that transporting from one location to another is a process of production in which an economically significant transformation takes place even if the good remains otherwise unchanged. The volume of transport services is measured by indicators such as ton-kilometres or passenger-kilometres which combine both the quantities of goods, or numbers of persons, and the distances over which they are transported. Factors such as speed, frequency or comfort also affect the quality of services provided. Transportation is a typical service activity in that the output produced consists of transformations of persons or goods that do not themselves form part of the output of the service producers. While the services performed are easily identified and quantified, they are not separate entities from the goods or persons in which they are incorporated. The production of transportation for own use within enterprises is an ancillary activity that is not separately identified and recorded.

b. Storage

113. Although the production of storage for the market may not be very extensive, the activity of storage is important in the economy as a whole as it is carried out in many enterprises. A good available at a later point of time may need to be treated as a different quality of good from the same good available at an earlier point of time if its supply and demand conditions change in the meanwhile. Thus, storing a good can be a process of production in which an economically significant transformation may take place even if the

good remains physically unchanged otherwise. Storage can be viewed as transportation over time rather than space. Of course, if the good, such as wine, also matures while in store - i.e., its physical properties are improved by the passage of time - the amount of production which takes place is correspondingly greater. The volume of storage services produced can be measured by indicators such as space-days which combine the volume of storage space provided with the length of time over which the goods are stored, taking account of other relevant factors such as the environment in which the goods are stored which affect the quality of service provided.

(i) Storage and the measurement of changes in inventories

114. The price of a good may change while it is being stored for at least three reasons:

(1) the physical qualities of the good may improve or deteriorate with the passage of time;

(2) there may be seasonal factors affecting the supply or the demand for the good that lead to regular, predictable variations in its price over the year, even though its physical qualities may not otherwise change;

(3) there may be general inflation or other general factors that lead to a change in the price of the good in question even though its physical or economic characteristics are not all changed over time.

115. In principle, the increase between the prices at which goods enter and are withdrawn from storage in the first two cases measure the value of additional output produced while the goods are being stored, with only the third type being treated as genuine price changes that generate nominal or real holding gains. In practice, however, it may be difficult to disentangle the effects of the different factors at work.

116. Suppose that there is no general price inflation. Consider the case of a good whose quality improves while being stored (e.g., wine). Conceptually, the good entering storage is not a finished product but work-in-progress if its production continues while it is being stored. The increase in its value while being stored must be treated as an addition to work-in-progress i.e., as additional output, and not as a price increase. By assumption, the good leaving storage is not the same as the one that entered. The accounting rules for the recording of changes in the value of inventories must be applied in such a way that the entries to inventories include not only the value of the good (work-in-progress) when it entered but also the value of the addition to work-in-progress that took place while it was being stored. In effect, the total output produced is valued by the price at which the good is ultimately sold when it is withdrawn, the additions to, and subtractions from, work-in-

progress cancelling each other out (in the absence of price changes due to general inflation).

117. Goods subject to seasonal fluctuations in price due to changing demand or supply conditions over time must be treated in a similar way. Suppose an annual crop is harvested at one point of time, put into storage and then gradually sold off, or used, over the remaining twelve months. Suppose further that the price gradually rises to reflect the increased scarcity of the good until the next harvest. In the absence of general price changes, the increase in the price of the good while being stored must be interpreted as measuring the value of an addition to work-in-progress, as in the previous example. The goods withdrawn from storage some months after the crop is harvested are economically different from those that entered because of the changing supply conditions over time. A similar argument may be used for goods that are produced throughout the year and entered into storage because they are sold only one time, such as Christmas: in this case, the demand conditions change over time. This kind of argument is not applicable, however, to most manufactured goods that are produced continuously throughout the year and are sold continuously: for example, vehicles. Changes in the prices of such goods while in inventories cannot be treated as additions to work-in-progress.

5. Wholesale and retail distribution

118. Although wholesalers and retailers actually buy and sell goods, the goods purchased are not treated as part of their intermediate consumption when they are resold with only minimal processing such as grading, cleaning, packaging, etc. Wholesalers and retailers are treated as supplying services rather than goods to their customers by storing and displaying a selection of goods in convenient locations and making them easily available for customers to buy. Their output is measured by the total value of the trade margins realised on the goods they purchase for resale. A trade margin is defined as the difference between the actual or imputed price realised on a good purchased for resale and the price that would have to be paid by the distributor to replace the good <u>at the time</u> it is sold or otherwise disposed of. The margins realised on some goods may be negative if their prices have to be marked down. They must be negative on goods that are never sold because they go to waste or are stolen.

119. The standard formula for measuring output has to be modified for wholesalers or retailers by deducting from the value of the goods sold or otherwise used the value of the goods purchased for resale. The output of a wholesaler or retailer is given by the following identity:

the value of output	=	the value of sales, including sales at reduced prices
	<u>plus</u>	the value of other uses of goods purchased for resale
	<u>minus</u>	the value of goods purchased for resale

plus the value of additions to inventories of goods for resale

minus the value of goods withdrawn from inventories of goods for resale, including losses due to wastage and theft.

120. The following points should be noted:

(1) Goods sold are valued at the prices at which they are actually sold, even if the trader has to mark their prices down to get rid of surpluses or avoid wastage.

(2) Goods provided to employees as remuneration in kind should be valued at the current purchasers' prices payable by the traders: that is, the realised margins are zero. Similarly, goods withdrawn by the owners of unincorporated enterprises for their own final consumption should be valued at the current purchasers' prices payable by the traders.

(3) Goods purchased for resale should be valued at the purchasers' prices paid by the traders: that is, including any transport charges invoiced separately by the suppliers or paid to third parties, but excluding the costs of any own-account transport services provided by the traders themselves.

(4) Additions to inventories of goods for resale should be valued at the purchasers' prices at the time of entry.

(5) Goods withdrawn from inventory of goods for resale should be valued at the purchasers' prices prevailing at the time they are withdrawn (as distinct from the prices at which they were originally purchased and entered inventories). Goods withdrawn from inventory include known losses due to wastage or theft that are valued in the same way as goods withdrawn for sale.

121. The margins realised on goods purchased for resale thus vary according to their eventual use. The margins realised on goods sold at the full prices intended by the traders could be described as the normal margins. In fixing these margins, traders take account not only of their ordinary costs such as intermediate consumption and compensation of employees but also of the fact that some goods may ultimately have to be sold off at reduced prices while others may go to waste or be stolen. The margins realised on goods whose prices have to be marked down are obviously less than the normal margins and could be negative. The margins on goods used to pay employees as compensation in kind or withdrawn for final consumption by owners are zero because of the way these goods are valued. Finally, the margins on goods wasted or stolen are negative and equal to the current purchasers' prices of replacements for them.

122. The average margin realised on goods purchased for resale may thus be expected to be less then the normal margin - possibly significantly less for certain types of goods such as fashion goods or perishable goods. Finally, it should be noted that margins are defined to exclude holding gains or losses on goods for resale while they are being held in inventory by wholesalers or retailers. As in the case of other types of production, holding gains and losses are excluded from output by valuing all entries to, or withdrawals from, inventories at the prices prevailing at the times the entries or withdrawals take place.

6. Operating leasing

123. The activity of renting out machinery or equipment for specified periods of time which are shorter than the total expected service lives of the machinery or equipment is termed operating leasing. It is a form of production in which the owner, or lessor, provides a service to the user, or lessee, the output of which is valued by the rental which the lessee pays to the lessor. Operating leasing has to be clearly distinguished from financial leasing, which is not a process of production but a method of financing.

124. Operating leasing can be identified by the following characteristics.

(1) The lessor, or owner of the machinery or equipment, maintains a stock of equipment in good working order which can be hired on demand, or a short notice, by users.

(2) The equipment may be rented out for varying periods of time. The lessee may renew the rental when the period expires and the user may hire the same piece of equipment on several occasions. However, the user does not undertake to rent the equipment over the whole of the expected service life of the equipment.

(3) The lessor is frequently responsible for the maintenance and repair of the equipment as part of the service which he provides to the lessee. The lessor must normally be a specialist in the operation of the equipment, a factor that may be important in the case of highly complicated equipment, such as computers, where the lessee and his employees, may not have the necessary expertise or facilities to service the equipment properly themselves. The lessor may also undertake to replace the equipment altogether in the event of a serious or prolonged breakdown.

125. Thus, the service provided by the lessor goes beyond the mere provision of a piece of equipment. It includes other elements such as convenience and security which can be important from the user's point of view. Operating leasing developed originally to meet the needs of users who require certain types of equipment only intermittently. However, with the evolution of increasingly complicated types of machinery, especially in the electronics field, the servicing and back-up facilities provided by a lessor are important

factors which may influence a user to rent. Other factors which may persuade users to rent over long periods rather than purchase are the consequences for the enterprise's balance sheet, cash flow or tax liability.

a. Financial leasing

126. In contrast to operating leasing, financial leasing is not itself a process of production. It is an alternative to lending as a method of financing the purchase of machinery and equipment. A financial lease is a contract between lessor and lessee whereby the lessor purchases the equipment and the lessee contracts to pay rentals which enable the lessor, over the period of the contract, to recover all, or virtually all, of his costs including interest. It is similar to a hire purchase contract. In the System, the lessor is treated as making a loan to the lessee which enables the latter to purchase the equipment: the rentals are then treated as covering repayments of the loan and interest payments.

127. Thus, operating leasing and financial leasing are treated as totally different kinds of activity, the one being a process of production while the other is a method by which funds are channelled from a lender to a borrower. Of course, some incidental services are provided by the lessor in the process of arranging the lease, but the value of these services is very small compared with the total rentals paid. It is therefore essential to distinguish between the two types of leasing, even though financial arrangements may be devised which are hybrids of the two and which are consequently difficult to classify.

7. Financial intermediaries except insurance corporations and pension funds

a. Introduction

128. This section is concerned with financial intermediaries except insurance corporations and pension funds, which are dealt with in the following sections.

129. Financial intermediaries incur liabilities on their own account on financial markets by borrowing funds which they lend on different terms and conditions to other institutional units. As explained in <chapter IV, Institutional Units and Sectors>, they intermediate between lenders and borrowers by channelling funds from one to the other, putting themselves at risk in the process. They include almost all institutions describing themselves as "banks". They also include unincorporated enterprises engaged on financial intermediation on a small scale; these may be important in some developing countries.

130. Some financial intermediaries raise most of their funds by taking deposits; others do so by issuing bills, bonds or other securities. They lend funds by making loans or advances, or by purchasing bills, bonds or other

securities. The pattern of their financial assets is different from that of their liabilities and in this way they transform the funds they receive in ways more suited to the requirements of borrowers. The rates of return they receive on the funds they lend are generally higher than the rates they pay on the funds they borrow, and they obtain most of the funds to defray their expenses and provide an operating surplus in this way. Many financial intermediaries do not charge explicitly for the intermediation services which they provide to their customers so that there may be no receipts from sales which can be used to value these services, although there may be an increasing tendency to make charges.

131. Financial intermediaries are also increasingly tending to provide various kinds of auxiliary financial services, or business services, as secondary activities: for example, currency exchange, or advice about investments, the purchase of real estate, or taxation. The output of such services is valued on the basis of the fees or commissions charged, in the same way as other services. The measurement of this output poses no special conceptual or practical problems. The question to be resolved here is how to value the output of financial intermediation for which no explicit charges are made and for which there are no sales receipts. This question is dealt with below, with additional details in an annex to this chapter.

b. The output of financial intermediation services indirectly measured

132. Some financial intermediaries are able to provide services for which they do not charge explicitly by paying or charging different rates of interest to borrowers and lenders (and to different categories of borrowers and lenders). They pay lower rates of interest than would otherwise be the case to those who lend them money and charge higher rates of interest to those who borrow from them. The resulting net receipts of interest are used to defray their expenses and provide an operating surplus. This scheme of interest rates avoids the need to charge their customers individually for services provided and leads to the pattern of interest rates observed in practice. However, in this situation, the System must use an indirect measure of the value of the services for which the intermediaries do not charge explicitly.

133. The total output of financial intermediaries for which no explicit charges are made is measured in the System as their total property income receivable minus their total interest payable, excluding the value of any property income receivable from the investment of their own funds, as such income does not arise from financial intermediation.

134. In principle, the total output should be allocated among uses of the services for which no explicit charge is made. When the requisite information is available, it is recommended that estimates of the following should be calculated and used to allocate the total output:

(1) For those to whom the intermediaries lend funds, both resident and non-resident, the difference between the interest actually charged on loans, etc. and the amount that would be paid if a reference rate were used;

(2) For those from whom the intermediaries borrow funds, both resident and non-resident, the difference between the interest they would receive if a reference rate were used and the interest they actually receive.

135. The reference rate to be used represents the pure cost of borrowing funds--that is, a rate from which the risk premium has been eliminated to the greatest extent possible and which does not include any intermediation services. The type of rate chosen as the reference rate may differ from country to country but the inter-bank lending rate would be a suitable choice when available; alternatively, the central bank lending rate could be used.

136. If the information needed to make such calculations is not available, the value of the output may be allocated using different indicators. For example, the total output could be allocated in proportion to the total financial assets and liabilities that exist between financial intermediaries and various groups of users, or in proportion to other relevant financial variables.

137. For the System as a whole, the calculation and allocation of the imputed values of services provided by financial intermediaries is equivalent to reclassifying certain parts of interest payments as payments for services. This reclassification has important consequences for the values of certain aggregate flows of goods and services - output, intermediate and final consumption, imports and exports - which affect the values added of particular industries and sectors, and also total gross domestic product (GDP). There are also implications for the flows of interest recorded in the Primary Distribution of Income Accounts. However, the saving of all the units concerned, including the financial intermediaries themselves, are not affected. Nor is the Financial Account affected.

c. Central banks

138. The services of financial intermediation provided by central banks should be measured in the same way as those of other financial intermediaries. Because of the unique functions which may be performed by central banks, the value of their output may sometimes appear exceptionally large in relation to the resources employed. Services other than financial intermediation which may be carried out by central banks should be valued by the fees or commissions charged, in the same way as for other financial enterprise.

d. Unincorporated financial intermediaries and money lenders

139. The output of unincorporated financial intermediaries, including those whose activities are not monitored and subject to regulation by central banks or other authorities, is measured in the same way as for financial corporations. Money lenders who incur liabilities on their own account in order to mobilise funds which they lend to others are clearly engaged on financial intermediation. Their output must be measured by the difference between the property income they receive from the lending of borrowed funds and the interest paid on the borrowed funds. As in the case of large corporations, the income they receive from the investment of their own funds is excluded from this calculation.

140. Some money lenders lend only their own funds. The activity of such small-scale money lenders, including many village money lenders, is not financial intermediation as their function is not to facilitate the channelling of funds from one group of institutional units to another. Lending as such is not a process of production and the activity of money lenders who lend only their own funds cannot be treated as the production of services. The interest received from such lending cannot therefore be treated as measuring the value of their output.

8. Insurance

141. The activity of insurance is intended to provide individual institutional units with financial protection against certain risks or contingencies. It is also a form of financial intermediation in which funds are collected from policy holders to be invested in financial or other assets which are held as technical reserves against the eventualities specified in the insurance policies. The funds collected from policy holders are ultimately channelled back to policy holders, although significant amounts of property income may be earned from the investment of the funds, and also holding gains or losses accrue, between the times the funds are received as premiums and the times they are paid out in claims or on maturity of the policies.

142. Only relatively small amounts out of the premiums paid on insurance policies can be construed as payments for the service of arranging the financial protection or security which insurance is intended to provide. No explicit charge is made by insurance enterprises for arranging the insurance, and the amounts of the implicit service charges have to be estimated residually from the total resources and payables of insurance enterprises, including the property income and capital gains (or losses) accruing from the investment of their reserves.

143. Insurance enterprises build up technical reserves for two reasons. The first is that insurance premiums are paid at the start of the period covered so that insurance enterprises typically hold funds for a period of time before the eventuality which gives rise to the payment occurs. This applies to non-

life insurance as well as to life insurance. The second reason is that there is sometimes an important time lag between the eventuality occurring and the payment of the subsequent claim taking place. Thus, at any given moment of time insurance enterprises hold considerable technical reserves in the form of actuarial reserves including reserves on "with-profits" life policies, prepayments of premiums in respect of future eventualities and reserves against outstanding claims. These technical reserves are invested in financial or non-financial assets, including property and real estate. The net income generated by these investments, i.e., the property income received less any interest or other expenses incurred, may exert a considerable influence on the level of premiums charged. The management of its investment portfolio is an integral part of the business of insurance which has a considerable bearing on the profitability and competitiveness of the enterprise.

144. The value of the output of insurance services is obtained residually from an accounting relationship in which the following five elements are involved:

(1) Total premiums earned: these refer to those parts of the premiums payable in the current or previous periods which cover the risks incurred during the accounting period in question. They are not equal to the premiums actually paid during the period, as the period covered by an individual premium is not generally the same as the accounting period. The prepayments of premiums, which refer to those parts of the premiums which cover risks in the subsequent accounting period or periods, are included under technical reserves. Thus, total premiums earned are equal to premiums receivable less the value of the changes in the reserves due to prepayments of premiums;

(2) Net income from the investment of the insurance technical reserves, as described above;

(3) Claims which become due for payment during the accounting period: claims become due when the eventuality takes place which gives rise to a valid claim; they are equal to claims payable plus changes in the reserves against outstanding claims;

(4) Changes in the actuarial reserves and reserves for with-profits insurance. These changes consist of allocations to the actuarial reserves and reserves for with-profits insurance policies to build up the capital sums guaranteed under these policies. Most of these reserves relate to life insurance but they may be needed in the case of non-life insurance when claims are paid out as annuities instead of lump sums;

(5) Holding gains or losses on investments which are allocated to policy holders or claimants. They may be a component of claims

due or added to the actuarial reserves or reserves for with-profits insurance policies.

145. Items (1), (2) and (5), namely:

total premiums earned;

net income from investment; and

holding gains or losses on investments

determine the total resources of an insurance enterprise arising from its insurance activities. (In this context, any income or holding gains or losses arising from the investment of the enterprise's own capital, as distinct from its technical reserves, are excluded.) Items (3) and (4), namely:

claims due;

and

changes in actuarial reserves and reserves for with-profits insurance

represent the total technical charges to be met out of these resources. The difference between the total resources and total technical charges represents the amount available to an insurance enterprise to cover its costs and provide for an operating surplus. It is therefore taken as measuring the value of the output of services produced by the enterprise. It may be presumed that insurance enterprises take all the items (2) to (5) into consideration when fixing the levels of the total premiums they charge in order to ensure that the excess of total resources over total charges provides sufficient remuneration for their own services.

146. Thus, the basic accounting identity used to estimate the value of the output of insurance services is as follows:

Total premiums earned		Claims due
+		+
Net income from investments	=	Changes in actuarial reserves and reserves for with-profits insurance
		-
		Holding gains or losses on investments allocated to policy holders or claimants
		+
		Value of the output of insurance services

147. The value of the output of insurance services is the balancing item that achieves the accounting identity. In practice, however, most of the technical

reserves and possibly all the actuarial reserves will relate to life insurance. Therefore, the total output of insurance services is calculated as above; the output of non-life insurance services is taken to be simply the difference between total premiums earned and claims due in respect of non-life insurance, and the output of life insurance services is taken to be the difference between the total output of insurance services and the output of non-life insurance services.

9. Pension funds

148. Pension funds are separate funds (i.e., separate institutional units) established for purposes of providing incomes on retirement for specific groups of employees which are organised, and directed, by private or public employers or jointly by the employers and their employees. These funds engage in financial transactions on their own account on financial markets and make investments by acquiring financial and non-financial assets. They do not include social security schemes organised for large sections of the community which are imposed, controlled or financed by general government. The only output produced by pension funds is that produced by their managers and other staff in the course of administering the funds, and the value of this output is measured by the total administration costs incurred in the process of managing the funds, including intermediate costs and consumption of fixed capital as well as the compensation of employees paid to the staff.

10. Research and development

149. Research and development by a market producer is an activity undertaken for the purpose of discovering or developing new products, including improved versions or qualities of existing products, or discovering or developing new or more efficient processes of production. Research and development is not an ancillary activity, and a separate establishment should be distinguished for it, when possible. The research and development undertaken by market producers on their own behalf should, in principle, be valued on the basis of the estimated basic prices that would be paid if the research were sub-contracted commercially, but is likely to have to be valued on the basis of the total production costs, in practice. Research and development undertaken by specialised commercial research laboratories or institutes is valued by receipts from sales, contracts, commissions, fees, etc. in the usual way. Research and development undertaken by government units, universities, non-profit research institutes, etc. is non-market production and is valued on the basis of the total costs incurred including the imputed rentals on own buildings. The activity of research and development is different from teaching and is classified separately in ISIC. In principle, the two activities ought to be distinguished from each when undertaken within a university or other institute of higher education, although there may be considerable practical difficulties when the same staff divide their time between both activities. There may also be interaction between teaching and

research which makes it difficult to separate them, even conceptually, in some cases.

11. The production of originals and copies

150. The production of books, recordings, films, software, tapes, disks, etc. is a two-stage process of which the first stage is the production of the original and the second stage the production and use of copies of the original. The output of the first stage is the original itself over which legal or de facto ownership can be established by copyright, patent or secrecy. The value of the original depends on the actual or expected receipts from the sale or use of copies at the second stage, which have to cover the costs of the original as well as costs incurred at the second stage.

151. The output of the first stage belongs to the originator (author, film company, programme writer, etc.). It is treated as a fixed capital asset. Thus, the first stage is the production of an intangible fixed asset possibly for sale or possibly for own-account gross fixed capital formation by the originator. The asset may be sold at any time to another institutional unit so that it is convenient to refer to the owner of the asset rather than the originator, although they may be one and the same unit. If the original is sold when it has been produced, the value of the output of the original is given by the price paid. If it is not sold, its value could be estimated on the basis of its production costs with a mark-up. However, the size of any mark-up must depend on the discounted value of the future receipts expected from using it in production, so that it is effectively this discounted value, however uncertain, that determines its value.

152. The owner of the asset may use it directly or to produce copies in subsequent periods. Consumption of fixed capital is recorded in respect of the asset in the same way as for any other capital asset used in production.

153. The owner may also license other producers to make use of the original in production. The latter may produce and sell copies, or use copies in other ways: for example, for film or music performances. In these cases, the owner is treated as providing services to the licensees that are recorded as part of their intermediate consumption. The payments made by the licenses may be described in various ways, such as fees, commissions or royalties, but however they are described they are treated as payments for services rendered by the owner. The use of the asset is then recorded as consumption of fixed capital in the production account of the owner. The services produced by the owner are valued by the fees, commissions, royalties, etc. received from the licensees.

G. Intermediate Consumption

1. Introduction

154. Intermediate consumption consists of the value of the goods and services which are consumed as inputs into production, excluding fixed assets whose consumption is recorded as consumption of fixed capital. The inputs are either transformed or entirely used up by the production process. Some inputs reemerge after having been transformed and incorporated into the outputs: for example, grain may be transformed into flour which in turn may be transformed into bread. Other inputs are completely consumed or used up: for example, fuels and most services.

155. Intermediate consumption does not include expenditures by enterprises on valuables. These consist of works of art, precious metals and precious stones and articles of jewellery fashioned out of such metals and stones. Valuables are assets acquired as stores of value. They are not used up in production and do not deteriorate physically over time. Expenditures on valuables are recorded in the Capital Account. Intermediate consumption also does not include the gradual using up of fixed assets owned by the enterprise which are only partially consumed during the accounting periods, this usage being recorded as consumption of fixed capital. However, intermediate consumption does include the costs of using fixed assets, whether equipment or buildings, which are rented from other institutional units, and also payments of fees, commissions, royalties, etc., under licensing arrangements, as explained in <<paragraph 153>>.

156. Intermediate consumption includes goods or services used up by ancillary activities such as purchasing, sales, marketing, accounting, data processing, transportation, storage, maintenance, security, etc. The goods and services consumed by these ancillary activities are not distinguished from those consumed by the principal (or secondary) activities of a producing establishment even though the levels at which these activities are carried out do not usually vary proportionately with the rate at which the principal activity is carried out.

2. The timing and valuation of intermediate consumption

157. The intermediate consumption of a good or service is recorded at the time when the good or service enters the process of production, as distinct from the time when it was acquired by the producer. In practice, the two times coincide for inputs of services, but not for goods, which may be acquired some time in advance of their use in production. A good or service consumed as an intermediate input is normally valued at the purchaser's price prevailing at the time it enters the process of production: that is, at the price the producer would have to pay to replace it at the time it is used. As explained in more detail in <<paragraphs 221-223>>, the purchaser's price can be decomposed into three elements, namely:

(1) The basic price received by the producer of the good or service;

(2) Any transportation or other costs paid separately by the purchaser in taking delivery of a good at the required time and location plus the cumulative trade margin on a good which passes through the chain of wholesale or retail distribution;

(3) Any non-deductible tax (less subsidy) on the product payable on the good or service when it was produced or while in transit to the purchaser.

For purposes of the System's input-output tables, it may be necessary to distinguish all three elements just listed but not in the accounts for institutional sectors or the central supply and use table.

158. In practice, establishments do not usually record the actual use of goods in production directly. Instead, they keep records of purchases of materials and supplies intended to be used as inputs and also of any changes in the amounts of such goods held in inventory. An estimate of intermediate consumption during a given accounting period can then be derived by subtracting changes in inventories of materials and supplies from the purchases made. Changes in inventories of materials and supplies are equal to entries less withdrawals less current losses on goods held in inventory. Thus, current losses reduce the value of changes in inventories and increase intermediate consumption. Goods entering and leaving inventory are valued at the purchasers' prices prevailing at the times the entries or withdrawals take place. This is exactly the same method as that used to value changes in inventories of goods produced as outputs from the production process. Thus, the earlier discussion of the properties and behaviour of the PIM applies equally to inventories of inputs as to inventories of outputs.

159. When goods or services produced within the same establishment are fed back as inputs into the production within the same establishment, they are not recorded as part of the intermediate consumption or the output of that establishment. On the other hand, deliveries of goods and services between different establishments belonging to the same enterprise are recorded as outputs by the producing establishments and must therefore be recorded as intermediate inputs by the receiving establishments.

3. The boundary between intermediate consumption and compensation of employees

160. Certain goods and services used by enterprises do not enter directly into the process of production itself but are consumed by employees working on that process. In such cases, it is necessary to decide whether the goods and services are intermediate consumption or, alternatively, remuneration in kind to employees. In general, when the goods or services are used by employees in their own time and at their own discretion for the direct satisfaction of their needs or wants, they constitute remuneration in kind. However, when

employees are obliged to use the goods or services in order to enable them to carry out their work, they constitute intermediate consumption.

161. It is immaterial to the employer whether they are treated as intermediate consumption or compensation of employees - they are both costs from the employer's viewpoint - and the net operating surplus is the same. However, reclassifying such goods and services from remuneration in kind to intermediate consumption, or vice versa, changes value added and balance of primary incomes, and hence GDP as a whole.

162. The following types of goods and services provided to employees must be treated as part of intermediate consumption.

(1) tools or equipment used exclusively, or mainly, at work;

(2) clothing or footwear of a kind which ordinary consumers do not choose to purchase or wear and which are worn exclusively, or mainly, at work: e.g., protective clothing, overalls or uniforms. However, uniforms or other special clothing which employees choose to wear extensively off-duty instead of ordinary clothing should be treated as remuneration in kind;

(3) accommodation services at the place of work of a kind which cannot be used by the households to which the employees belong - barracks, cabins, dormitories, huts and so on;

(4) special meals or drinks necessitated by exceptional working conditions, or meals or drinks provided to servicemen or others while on active duty;

(5) transportation and hotel services provided while the employee is travelling on business;

(6) changing facilities, washrooms, showers, baths, etc. necessitated by the nature of the work;

(7) first aid facilities, medical examinations or other health checks required because of the nature of the work.

Employees may sometimes be responsible for purchasing the kinds of goods or services listed above and be subsequently reimbursed in cash by the employer. Such cash reimbursements must be treated as intermediate expenditures by the employer and not as part of the employee's wages and salaries.

163. The provision of other kinds of goods and services, such as meals, ordinary housing services, the services of vehicles or other durable consumer goods used extensively away from work, transportation to and from work, etc. should be treated as remuneration in kind, as explained more fully in <chapter VII, Primary Distribution of Income>.

4. The boundary between intermediate consumption and gross fixed capital formation

164. Intermediate consumption measures the value of goods and services that are transformed or entirely used up in the course of production during the accounting period. It does not cover the use of fixed assets owned by the enterprise nor expenditures on gross fixed capital formation. The boundary between these kinds of expenditures and intermediate consumption is explained in more detail below.

a. Small tools

165. Expenditures on durable producer goods which are small, inexpensive and used to perform relatively simple operations may be treated as intermediate consumption when such expenditures are made regularly and are very small compared with expenditures on machinery and equipment. Examples of such goods are hand tools such as saws, spades, knives, axes, hammers, screwdrivers, spanners and so on. However, in countries where such tools account for a significant part of the stock of producers' durable goods, they may be treated as fixed assets.

b. Maintenance and repairs

166. The distinction between maintenance and repairs and gross fixed capital formation is not clear cut. The maintenance and repair of a fixed asset already in use in production constitutes intermediate consumption. Ordinary maintenance and repair, including the replacement of defective parts, are typical ancillary activities but they may also be provided by a separate establishment within the same enterprise or purchased from other enterprises.

167. The practical problem is to distinguish ordinary maintenance and repairs from major renovations, reconstructions or enlargements which go considerably beyond what is required simply to keep the fixed assets in good working order. Major renovations, reconstructions, or enlargements of existing fixed assets may enhance their efficiency or capacity or prolong their expected working lives. They must be treated as gross fixed capital formation as they add to the stock of fixed assets in existence.

168. Ordinary maintenance and repairs are distinguished by two features:

(1) They are activities that owners or users of fixed assets are obliged to undertake periodically in order to be able to utilise such an asset over its expected service life. They are current costs that cannot be avoided if the fixed assets are to continue to be used. The owner or user cannot afford to neglect maintenance and repairs as the expected service life may be drastically shortened otherwise.

(2) Maintenance and repairs do not change the fixed asset or its performance, but simply maintain it in good working order or restore it to its previous condition in the event of a breakdown. Defective parts are replaced by new parts of the same kind without changing the basic nature of the fixed asset.

169. On the other hand, major renovations or enlargements to fixed assets are distinguished by the following features:

(1) The decision to renovate, reconstruct or enlarge a fixed asset is a deliberate investment decision which may be undertaken at any time and is not dictated by the condition of the asset. Major renovations of ships, buildings or other structures are frequently undertaken well before the end of their normal service lives.

(2) Major renovations or enlargements increase the performance or capacity of existing fixed assets or significantly extend their previously expected service lives. Enlarging or extending an existing building or structure obviously constitutes a major change in this sense, but a complete refitting or restructuring of the interior of a building, or ship, also qualifies.

c. Research and development, training, etc.

170. Research and development and training are undertaken with the objective of improving efficiency or productivity or deriving other future benefits so that they are inherently investment, rather than consumption, type activities. However, other activities, such as marketing or environmental protection, may have similar characteristics. In order to classify such activities as investment type it would be necessary to have clear criteria for delineating them from other activities, to be able to identify and classify the assets produced, to be able to value such assets in an economically meaningful way and to know the rate at which they depreciate over time. In practice, it is difficult to meet all these requirements. By convention, therefore, all the outputs produced by research and development, staff training, market research and similar activities are treated as being consumed as intermediate inputs even though some of them may bring future benefits.

171. As already noted, research and development is not an ancillary activity like purchasing, book keeping, storage and maintenance which tend to be found to some extent or other in all establishments. When research and development is carried out on a significant scale within an enterprise, it would be desirable to identify a separate establishment for it so that the relevant inputs and outputs could be distinguished for analytical purposes. Because of the difficulty of obtaining price data, the output will usually have to be valued by total costs of production, as in the case of most other own-account production. The output produced has then to be treated as being delivered to the establishment, or establishments, which make up the rest of the enterprise and included in their intermediate consumption. When there are several other

establishments, the amounts of research and development delivered can be distributed in proportion to their value added, or total costs, in much the same way that the output of head offices or other central facilities has to be allocated. Similarly, when an enterprise engages in activities such as staff training or market research on a significant scale, it would be desirable for separate establishments to be identified so that information about those activities becomes more accessible for analytical or policy purposes.

172. When an enterprise contracts an outside agency to undertake research and development, staff training, market research or similar activities on its behalf, the expenditures incurred by the enterprise are treated as purchases of services used for purposes of intermediate consumption.

d. Mineral exploration

173. Expenditures on mineral exploration are not treated as intermediate consumption. Expenditures on mineral exploration, whether successful or not, are needed to acquire new reserves and are therefore all classified as gross fixed capital formation.

e. Military equipment

174. In the past, it has been conventional in national accounts to treat all goods except dwellings acquired by governmental establishments engaged on the production of defence services, that is Class 7522 of the ISIC, as intermediate inputs whether the goods are non-durable or durable. Thus, ships, aircraft, vehicles and other equipment acquired by military establishments, and the construction of buildings, roads, airfields, docks, etc. for use by military establishments have always been treated as intermediate consumption rather than capital formation. This implies that the output from Class 7522 is produced without any inputs of capital although the rationale for this has never been clear. It has sometimes been suggested that it is impossible to estimate service lives for the assets concerned, but this is not true for most of them.

175. In order to be treated as capital, a good must not only be durable but used repeatedly or continuously in production over a number of accounting periods. However, if military weapons such as rockets, missiles and their warheads, are actually used in combat, they are used to destroy and not to produce. Thus, the actual use of destructive weapons can scarcely be treated as an input into an economic process of production.

176. The provision of defence, however, can certainly be construed as a form of production from which people benefit and for which they are prepared to pay, individually or collectively. Moreover, the provision of defence, like any other productive activity, does require the repeated or continuous usage of certain durable goods over a number of accounting periods. Thus, distinction can be drawn between those durable goods that are actually used in

much the same way as in any other type of production, and those which either are never used or, if they are used, do not constitute inputs into a productive process. This suggests a distinction between ordinary producers' durable goods of a kind used throughout the economy and destructive military weapons designed for combat.

177. On this line of reasoning, rockets, missiles and their warheads are not to be treated as fixed assets. By extension, missile silos, warships, submarines, fighter aircraft and bombers, and armoured vehicles whose sole function is to release such weapons should also not be treated as fixed assets. On the other hand, the airfields, docks or other facilities used as bases by these same ships, submarines or aircraft can be used with little or no modification for quite different purposes of a non-military nature. Very often such facilities are shared between military and civilian use. Moreover, the manner in which the facilities are utilised is essentially the same whether they are used by military personnel or others.

178. For these reasons, only expenditures by the military on weapons of destruction and the equipment needed to deliver them should be classified as intermediate consumption. Conversely, the construction of buildings for use by military personnel, including hospitals and schools, and also of roads, bridges, airfields, docks, etc. for use by military establishments should be treated as fixed capital formation. In addition, machinery and equipment of the same type as that used by civil establishments for non-military purposes should also be treated as fixed capital formation: for example, vehicles, ships or aircraft used for the transport of persons or goods; computers and office machinery and equipment; and so on.

179. Light weapons and armoured vehicles are also acquired by non-military establishments engaged on internal security or policing activities. In addition, light weapons and armoured vehicles may be acquired by market security services. Light weapons or armoured vehicles acquired by police and security forces are therefore treated as fixed assets, even though expenditures on the same kind of weaponry by military establishments would be treated as intermediate.

5. Non-market services

180. Collective services provided by government units are not included in the intermediate consumption of enterprises, even though they benefit from the provision of transport facilities, security, etc. It would be impossible to identify those collective services that benefit enterprises rather than households and to allocate such services between individual enterprises. Some individual non-market goods or services may also be provided to market producers, such as veterinary services to farmers. By convention they are not included in their intermediate consumption and they are not separated from collective services.

6. Services of business associations

181. Non-profit institutions in the form of business associations that exist to protect the interests of their members are effectively enterprises. The subscriptions paid by the businesses can be treated as payments for services rendered. These services are consumed as intermediate inputs by the members of the association and are valued by the amounts paid in subscriptions, contributions or dues.

7. The boundary between intermediate consumption and value added

182. The boundary between intermediate consumption and value added is not a rigid one fixed purely by the technology of production. It is also influenced by the way in which the production is organised and distributed between different establishments or enterprises.

183. The types of services produced by ancillary activities can either be produced for own use within the same establishment or obtained from outside, i.e., from specialist market enterprises. If an establishment obtains the services from outside instead of from ancillary activities, its intermediate consumption is increased and its value added reduced, even though its principal activity remains completely unchanged. As ancillary activities themselves have intermediate inputs, however, the increase in intermediate consumption is not quite as great as the value of the services purchased, ceteris paribus. Nevertheless, the distribution of value added between establishments and enterprises may be greatly influenced by the extent to which the services of ancillary activities are produced in-house or obtained from outside. Similarly, observed input-output ratios may vary significantly for the same reason, even between equally efficient establishments utilising the same technology for their principal activity.

184. The decision to rent, rather than purchase buildings, machinery or equipment, can also have a major impact on the ratio of intermediate consumption to value added and the distribution of value added between producers. Rentals paid on buildings or machinery or equipment under an operating lease constitute purchases of services and are recorded under intermediate consumption. However, if the enterprise owns its buildings, machinery and equipment, most of the costs associated with their use are not recorded under intermediate consumption. The capital consumption on the fixed assets forms part of gross value added while interest costs, both actual and implicit, have to be met out of the net operating surplus. Only the costs of maintenance and repairs appear under intermediate consumption. Decisions to rent rather than purchase may be influenced by factors quite unrelated to the technology of production such as taxation, the availability of finance, or the consequences for the balance sheet.

H. Consumption of Fixed Capital

1. Introduction

185. Consumption of fixed capital may be defined in general terms as the decline, during the course of the accounting period, in the current value of the stock of fixed assets held by producers resulting from physical deterioration, normal obsolescence or normal accidental damage. It excludes the value of fixed assets destroyed by acts of war or exceptional events such as major natural disasters which occur very infrequently. Consumption of fixed capital is defined in the System in a way which is intended to be theoretically appropriate and relevant for purposes of economic analysis. Its value may deviate considerably from depreciation as recorded in business accounts or as allowed for taxation purposes, especially when there is inflation.

186. Fixed assets may have been purchased in the past at times when both relative prices and the general price level were very different from prices in the current period. In order to be consistent with the other entries in the same production account, consumption of fixed capital must be valued with reference to the same overall set of current prices as that used to value output and intermediate consumption. Consumption of fixed capital should reflect underlying resource costs and relative demands at the time the production takes place. It should therefore be calculated using the actual or estimated prices and rentals of fixed assets prevailing at that time and not at the times the goods were originally acquired. The "historic costs" of fixed assets, i.e., the prices originally paid for them, may become quite irrelevant for the calculation of consumption of fixed capital if their prices change sufficiently over time.

2. Consumption of fixed capital and rentals on fixed assets

187. The rental is the amount paid by the user of a fixed asset to its owner, under an operating lease or similar contract, for the right to use that asset in production for a specified period of time. The rental needs to be large enough to cover not only the reduction in the value of the asset over that period - i.e., the consumption of fixed capital - but also the interest costs on the value of the asset at the start of the period and any other costs incurred by the owner. The interest costs represent interest paid on the use of borrowed funds and the loss of interest incurred as a result of investing own funds in the purchase of the fixed asset instead of a financial asset. From the point of view of the user, the full cost of using the fixed asset in production is measured by the actual or imputed rental on the asset and not by consumption of fixed capital alone. When the asset is actually rented under an operating lease or similar contract, the rental is recorded under intermediate consumption as the purchase of a service produced by the lessor. Even when the user and the owner are one and the same institution, consumption of fixed capital does not measure the full cost of using the asset.

188. The value of a fixed asset to its owner at any point of time is determined by the present value of the future rentals (i.e., the sum of the discounted values of the stream of future rentals) that can be expected over its remaining service life. Consumption of fixed capital is therefore measured by the decrease, between the beginning and the end of the current accounting period, in the present value of the remaining sequence of rentals. The extent of the decrease will be influenced not only by the amount by which the efficiency of the asset may have declined during the current period but also by the shortening of its service life and the rate at which its economic efficiency declines over its remaining service life. The flow of future rentals which determine the present values used to derive consumption of fixed capital must, of course, be valued at current prices or rates.

189. The calculation of consumption of fixed capital is a forward looking measure that is determined by future, and not past, events. The future rentals on which its value depends themselves depend upon the benefits which institutional units expect to derive in the future from using the asset in production over the remainder of its service life. Unlike depreciation as usually calculated in business accounts, consumption of fixed capital is not, at least in principle, a method of allocating the costs of past expenditures on fixed assets over subsequent accounting periods. The value of a fixed asset at a given moment of time depends only on the remaining benefits to be derived from its use, and consumption of fixed capital must be based on values calculated in this way.

3. The calculation of consumption of fixed capital

190. Depreciation as recorded in business accounts may not provide the right kind of information for the calculation of consumption of fixed capital, for reasons just given. If data on depreciation are used, they must, at the very least, be adjusted from historic costs to current prices. However, depreciation allowances for tax purposes have often been grossly manipulated in quite arbitrary ways to try to influence rates of investment and are best ignored altogether in many cases. It is therefore recommended that independent estimates of consumption of fixed capital should be compiled in conjunction with estimates of the capital stock. These can be built up from data on gross fixed capital formation in the past combined with estimates of the rates at which the efficiency of fixed assets declines over their service lives. As a result of market forces, the purchaser's price of a new fixed asset should provide a good initial estimate of the present value of the future rentals which can be derived from it. Subsequent changes in its value can then be deduced analytically from information or assumptions about the rate at which its efficiency in production declines over time. This method of building up estimates of the capital stock and changes in the capital stock over time is known as the perpetual inventory method, or PIM. Estimates of consumption of fixed capital are obtained as a by-product of the PIM.

4. The coverage of consumption of fixed capital

191. Capital consumption is calculated for all fixed assets - that is, tangible and intangible fixed assets - owned by producers, but not for valuables (precious metals, precious stones, etc.) that are acquired precisely because their value, in real terms, is not expected to decline over time. Fixed assets must themselves have been produced as outputs from processes of production as defined in the System. Consumption of fixed capital does not therefore cover the depletion or degradation of non-produced, assets such as land, mineral or other deposits, or coal, oil, or natural gas.

192. Capital consumption must, however, be calculated in respect of fixed assets which are constructed to improve land, such as drainage systems, dykes, or breakwaters or on assets which are constructed on or through land - roads, railway tracks, tunnels, dams and so on. Although some structures such as roads or railway tracks may appear to have infinite lives if properly maintained, it must be remembered that the value of assets may decline not merely because they deteriorate physically but because of a decrease in the demand for their services as a result of technical progress and the appearance of new substitutes for them. In practice, many structures, including roads and railway tracks, are scrapped or demolished because they have become obsolete. Even though the estimated service lives may be very long for some structures, such as road, bridges, dams, etc., they cannot be assumed to be infinite. Thus, capital consumption needs to be calculated for all types of structures, including those owned and maintained by government units, as well as machinery and equipment.

193. Losses of fixed assets due to normal accidental damage are also included under consumption of fixed capital: that is, damage caused to assets used in production resulting from their exposure to the risk of fires, storms, accidents due to human errors, etc. These kinds of accidents occur with predictable regularity so that they are taken into account in calculating the average service lives of the goods in question. At the level of the economy as a whole, the actual normal accidental damage within a given accounting period may be expected to be equal, or close, to the average. However, for an individual unit, or group of units, any difference between the average and the actual normal accidental damage within a given period is recorded in the Other Changes in Volume of Assets Account. On the other hand, losses due to war or to major natural disasters which occur very infrequently - major earthquakes, hurricanes, tidal waves, etc. - are not included under consumption of fixed capital. There is no reason for such losses to appear in the Production Account as charges against output. The values of the assets lost in these ways are recorded in the Other Changes in Volume of Assets Account. Similarly, although consumption of fixed capital includes reductions in the value of fixed assets resulting from normal, expected rates of obsolescence, it should not include losses due to unexpected technological developments that may significantly shorten the service lives of a group of existing fixed assets. Such losses are treated in the same way as losses due to above average rates of normal accidental damage. In practice, however, it may be difficult to measure such losses.

5. The pe·petual-inventory-method

194. A brief explanation of how consumption of fixed capital may be calculated within the context of PIM of calculating the capital stock is given in this section. The PIM itself is described more fully in the <annex IV, Capital Stock and Consumption of Fixed Capital>.

a. Calculation of the gross capital stock at current prices

195. The PIM requires an estimate to be made of the stock of fixed assets in existence and in the hands of producers. This is done by estimating how many of the fixed assets installed as a result of gross fixed capital formation undertaken in previous years have survived to the current period. Average service lives, or survival functions, based on observations or technical studies may be applied to past investments for this purpose. Fixed assets purchased at different prices in the past have then to be revalued at the prices of the current period. This may be done by utilising appropriate price indices for fixed assets. The construction of suitable price indices covering long periods of time raises difficult conceptual and practical problems, but these technical problems of price measurement will not be pursued further in the present context. They are considered more fully in <chapter XVI, Constant Prices>. The stock of fixed assets surviving from past investment and revalued at the purchasers' prices of the current period is described as the gross capital stock. The gross capital stock can also be measured at the prices of some base year if it is desired to have annual time series for the gross capital stock at constant prices.

b. Relative efficiencies and rentals

196. The inputs into production obtained from the use of a given fixed asset tend to diminish over time. The rate at which the efficiency declines may vary from one type of asset to another. Various profiles are possible: for example,

(1) constant efficiency until the asset disintegrates: for example, an electric light bulb;

(2) a linear decline in efficiency: the service life ends when efficiency declines to zero;

(3) a constant geometric, or exponential decline in efficiency.

In each of these cases, it is sufficient to know one parameter, the length of the service life or the rate of geometric decline, in order to have full information about the pattern of relative efficiency over time.

197. Another possible profile is a combination of cases (1) and (2) above: that is, a linear rate of decline with the asset disintegrating before efficiency has fallen to zero. This mixed case will be referred to later.

198. The amounts of rentals which users are prepared to pay will be proportional to the relative efficiencies of the assets. If one is twice as efficient as another for the user's purposes, the user will be prepared to pay a rental which is also twice as great. Thus, the efficiency profiles of fixed assets determine the profiles of the rentals which they command over their service lives (assuming that prices remain, or are held, constant). Once the profiles of the rentals have been estimated over the service lives of the fixed assets, it becomes possible to calculate the consumption of fixed capital, period by period.

c. Rates of capital consumption

199. Consumption of fixed capital is measured by the reduction in the present value of the remaining rentals, as explained earlier. This reduction, and the rate at which it takes place over time, must be clearly distinguished from the decline in the efficiency of the capital assets themselves. The distinction is most obvious in the first case listed in <<paragraph 196>>. Although the efficiency, and hence the rental, of an asset may remain constant from period to period until it disintegrates, the capital consumption is not constant. It can easily be shown in this case that the decline in the present value of the remaining rentals from period to period is considerably lower earlier in the life of the asset than when the asset is approaching the end of its life. Capital consumption tends to increase as the asset gets older even though the efficiency and rental remain constant to the end. However, the gradual increase in capital consumption would be eliminated if the efficiency and rentals were tending to decrease over time even before the asset disintegrates. This is the mixed case referred to above obtained by combining profiles (1) and (2) so that the rentals fall at a linear rate to a cut-off point before they reach zero. This kind of profile is capable of generating a constant rate of capital consumption over the life of the asset. In other words, it can lead to constant or "straight-line depreciation" as it is commonly described.

200. One major advantage of straight-line depreciation is its simplicity. It can be calculated merely by dividing the purchaser's price of a new fixed asset by the number of years of service life, assuming that the purchaser's price of a new asset approximates the present value of the future rentals. From a theoretical point of view, the validity of straight-line depreciation depends upon whether it is reasonable to assume some combination of profiles (1) and (2) for the rentals. Because of its simplicity, straight-line depreciation is widely used in business accounting. In principle, it is also acceptable for purposes of calculating consumption of fixed capital in the System, provided that the implied profile for the rentals is believed to be not unrealistic.

201. On the other hand, when the efficiency and rentals on a fixed asset decline at a constant geometric rate from period to period it can easily be shown that capital consumption also declines at the same rate. The coincidence between the two rates is extremely convenient analytically and this case figures prominently in the theoretical literature. It is also easy to calculate. In theory, the life of an asset is infinite under geometric depreciation. However, when an asset has an observed average service life of n years, a good approximation to geometric depreciation can be obtained by calculating the rate of depreciation as a constant fraction, 2/n, of the written down value of the good at the start of each year. This is the so-called double declining balance method.

202. The rate of depreciation using the double declining balance method is obviously twice that of linear depreciation in the first year. However, the absolute value of capital consumption declines from year to year under any geometric, or declining balance, formula, so that at some point it must fall below the corresponding figure that would be obtained using straight-line depreciation. In other words, the double declining balance method leads to a much more "accelerated" pattern of capital consumption. This profile is considered to be more realistic by many economists and observations on the prices of many existing tangible fixed assets tend to support it. Many business accountants also prefer an accelerated depreciation method as being more "prudent" because it tends to lead to lower values for assets in the balance sheet.

203. Both the linear and the geometric, or declining balance, methods are easy to apply. The choice between them depends upon knowledge, or assumptions, about the implied profiles of rentals which underlie them. It is not possible on a priori grounds to recommend the use of one in preference to the other in all circumstances. It is possible, for example, that linear depreciation may be realistic in the case of structures, while geometric depreciation is more realistic in the case of machinery or equipment. In practice, the choice of formula seems to rest between one or other of these two methods, and there seems little justification for the use of more complex formulae.

d. Values of consumption of fixed capital

204. The value of the capital consumption on a fixed asset may be estimated by applying either the linear or geometric depreciation formula to the actual or estimated current purchaser's price of a new asset of the same type. In the case of geometric depreciation, the absolute value of the consumption of fixed capital depends on the age of the asset in question, but not, of course, in the case of linear depreciation. Consumption of fixed capital has to be calculated in this way for all the fixed assets which make up the gross capital stock valued at current prices. The consumption of fixed capital for a particular sector or industry is then obtained as the sum of the estimates for all the fixed assets owned by the units in that sector or industry.

e. Gross and net capital stocks

205. The value at current prices of the gross capital stock is obtained by making use of price indices for fixed assets to value all fixed assets still in use at the actual or estimated current purchasers' prices for new assets of the same type, irrespectively of the age of the assets. The net, or written-down, value of a fixed asset is equal to the actual or estimated current purchaser's price of a new asset of the same type less the cumulative value of the consumption of fixed capital accrued up to that point of time. The values in earlier periods must, of course, all be calculated with reference to the current purchaser's price of a new asset for this purpose. The sum of the written-down values of all the fixed assets still in use is described as the net capital stock.

206. Fixed assets figure prominently in the balance sheets of their owners. The values to be recorded in the balance sheets of the System are the net, or written-down, values just described. To be precise, the value of a fixed asset shown in the balance sheet is the actual or estimated purchaser's price of a new asset of that type at the time the balance sheet is drawn up less the cumulative consumption of fixed capital incurred up to that time calculated with reference to the same purchaser's price.

6. "Gross" and "net" recording

207. The consumption of fixed capital is one of the most important elements in the System. In most cases, when a distinction is drawn between "gross" and "net", recording gross means without deducting consumption of fixed capital while recording net means after deducting consumption of fixed capital. In particular, all the major balancing items in the accounts from value added through to saving may be recorded gross or net: that is, before or after deducting consumption of fixed capital. It should also be noted that consumption of fixed capital is typically quite large compared with most of the net balancing items. It may account for 10 per cent or more of total GDP.

208. It is clear from the previous sections that the consumption of fixed capital is one of the most difficult items in the accounts to measure and estimate. The depreciation figures recorded in business accounts, or allowed for tax purposes, may be very difficult to adjust to bring them into line with consumption of fixed capital as defined in the System, while it may not be possible to estimate consumption of fixed capital using the PIM if long time series of gross fixed capital formation are not available in some detail. Moreover, consumption of fixed capital does not represent the aggregate value of a set of transactions. It is an imputed figure whose economic significance is somewhat different from other major entries in the accounts based mainly on market transactions.

209. For these reasons, the major balancing items in national accounts have always tended to be recorded both gross and net of consumption of fixed capital. This tradition is continued in the System where provision is also

made for affected balances to be recorded both ways. In general, the gross figure is obviously the easier to estimate and may therefore be more reliable, but the net figure is usually the one that is conceptually more appropriate and relevant for analytical purposes.

I. The Valuation of Outputs and Inputs

1. Introduction

210. More than one set of prices may be used to value outputs and inputs depending upon how taxes and subsidies on products, and also transport and delivery charges, are recorded. Moreover, value added taxes, or VAT, and similar deductible taxes may also be recorded in more than one way. The methods of valuation used in the System are explained in this section.

2. Basic and producers' prices

211. The System utilises two kinds of output prices, namely basic prices and producers' prices.

(1) The basic price is the price received by a producer for a unit of a good or service produced as output excluding any tax payable or subsidy receivable on the product as a consequence of its sale or use. It excludes any delivery charges invoiced separately by the producer.

(2) The producer's price is the price received by a producer for a unit of a good or service produced as output including any tax payable or subsidy receivable on the product as a consequence of its sale or use except invoiced VAT. It also excludes any delivery charges invoiced separately by the producer.

Both the producer's and the basic price exclude any VAT, or similar deductible tax, invoiced on the output sold. The difference between the two prices is that the basic price also excludes any other tax, or subsidy, payable or receivable per unit of output. Both producers' and basic prices are actual transaction prices which can be directly observed and recorded. Basic prices are often reported in statistical enquiries and some official "producer price" indices actually refer to basic prices rather than to producers' prices as defined here.

212. When output is recorded at basic prices, any tax actually payable on the product is treated as if it were paid by the purchaser directly to the government instead of being an integral part of the price paid to the producer. Conversely, any subsidy on the product is treated as if it were received directly by the purchaser and not the producer. The basic price measures the amount retained by the producer and is therefore the price most

relevant for the producer's decision taking. It is becoming increasingly common in many countries for producers to itemise taxes separately on their invoices so that purchasers are informed about how much they are paying to the producer and how much as taxes to the government.

a. VAT and similar deductible taxes

213. Many countries have adopted some form of VAT. VAT is a wide ranging tax usually designed to cover all goods and services. In some countries, VAT may replace most other forms of taxes on products, but VAT may also be levied in addition to some other taxes on products, such as excise duties on tobacco, alcoholic drink or fuel oils.

214. VAT is a tax on products collected in stages by enterprises but which is ultimately borne by the final purchasers of the goods or services produced. There exist in some countries taxes that are narrower in scope than VAT but may also be deductible by producers. They are treated in the System in the same way as VAT. Producers are required to charge certain percentage rates of VAT on the goods or services they sell. The VAT is shown separately on the sellers' invoices so that purchasers know the amounts they have paid. However, producers are not required to pay to the government the full amounts of the VAT invoiced to their customers because they are usually permitted to deduct the VAT that they themselves have paid on goods and services purchased for their own intermediate consumption or gross fixed capital formation. Producers are obliged to pay only the difference between the VAT on their sales and the VAT on their purchases for intermediate consumption or capital formation - hence the expression value added tax. VAT is not usually charged on sales to non-residents - i.e., exports. The percentage rate of VAT is also liable to vary between different categories of goods and services and also according to the type of purchaser.

215. The following terminology needs to be defined:

(1) invoiced VAT: this is the VAT payable on the sales of a producer: it is shown separately on the invoice which the producer presents to the purchaser;

(2) deductible VAT: this is the VAT payable on purchases of goods or services intended for intermediate consumption, gross fixed capital formation or for resale which a producer is permitted to deduct from his own VAT liability to the government in respect of VAT invoiced to his customers;

(3) non-deductible VAT: this is VAT payable by a purchaser which is not deductible from his own VAT liability, if any.

Thus, a market producer is able to recover the costs of any deductible VAT payable on his own purchases by reducing the amount of his own VAT liability in respect of the VAT invoiced to his own customers. On the other hand, the

VAT paid by households for purposes of final consumption or fixed capital formation in dwellings is not deductible. The VAT payable by non-market producers owned by government units or NPIs may also not be deductible.

(i) Gross and net recording of VAT

216. There are two alternative systems that may be used to record VAT, namely the "gross" or "net" systems. Under the gross system all transactions are recorded including the amounts of any invoiced VAT. Thus, the purchaser and the seller record the same price, irrespectively of whether or not the purchaser is able to deduct the VAT subsequently.

217. While the gross system of recording seems to accord with the traditional notion of recording at market prices, it presents some difficulties. Firstly, practical experience with the operation of VAT over many years in a number of countries has shown it may be difficult, if not impossible, to utilise the gross system because of the way in which business accounts are computed and records are kept. Sales are normally reported excluding invoiced VAT in most industrial enquiries and business surveys. Conversely, purchases of goods and services by producers are usually recorded excluding deductible VAT. Although the gross system has been tried in some countries, it has had to be abandoned for these reasons. Secondly, it can be argued that the gross system distorts economic reality to the extent that it does not reflect the amounts of VAT actually paid by businesses. Large amounts of invoiced VAT are deductible and thus represent only notional or putative tax liabilities.

218. The System therefore requires that the net system of recording VAT should be followed. In the net system:

(1) outputs of goods and services are valued excluding invoiced VAT: imports are similarly valued excluding invoiced VAT;

(2) purchases of goods and services are recorded including non-deductible VAT.

Under the net system, VAT is recorded as being borne by purchasers, not sellers, and then only by those purchasers who are not able to deduct it. Almost all VAT is therefore recorded in the System as being paid on final uses - mainly on household consumption. Small amounts of VAT may, however, be paid by businesses in respect of certain kinds of purchases on which VAT may not be deductible.

219. The disadvantage of the net system is that different prices must be recorded for the two parties to the same transaction when the VAT is not deductible. The price recorded for the producer excludes the invoiced VAT whereas the price recorded for the purchaser includes the invoiced VAT whenever it is not deductible. Thus, on aggregate, the total value of the expenditures recorded for purchasers must exceed the total value of the

corresponding sales receipts recorded for producers by the total amount raised in non-deductible VAT.

220. The traditional concept of the "market" price becomes somewhat blurred under a system of VAT or similar deductible taxes because there may be two different prices for a single transaction: one from the seller's point of view and another from the purchaser's, depending upon whether or not the tax is deductible. Moreover, it is difficult to interpret the producer's price defined to exclude invoiced VAT - i.e., a tax on a product - as a "market" price in the traditional sense of that term. The producer's price thus defined is a hybrid which excludes some, but not all, taxes on products. The basic price, which excludes all taxes or subsidies on outputs becomes a clearer concept in these circumstances and, partly for this reason, is the preferred method for valuing the output of producers.

3. Purchasers' prices

221. The purchaser's price is the price paid by the purchaser, excluding any VAT or similar deductible tax, in order to take delivery of a good or service at the time and place required by the purchaser. The purchaser's price of a good includes any transport charges paid separately by the purchaser to take delivery at the required time and place.

222. When comparing the purchaser's price with the producer's or basic price, it is important to specify whether they refer to the same transaction or two different transactions. For certain purposes, including input-output analysis, it may be convenient to compare the price paid by the final purchaser of a good after it has passed through the wholesale and retail distribution chains with the producer's price received by its original producer. In this case, the prices refer to two different transactions taking place at quite different times and locations: they must differ at least by the amount of the wholesale and retail trade margins.

223. When the prices refer to the same transaction, that is, the purchaser buys directly from the producer, the purchaser's price may exceed the producer's price by:

(1) the value of any non-deductible VAT payable by the purchaser,

and

(2) the value of any delivery charges on a good paid separately by the purchaser and not included in the producer's price.

It follows that the purchaser's price may exceed the basic price by the amount of the two items just listed plus the value of any taxes less subsidies on the product (other than VAT).

4. General valuation principles

a. Output

224. Goods and services produced for the market may be valued either at basic prices or at producer's prices. The preferred method of valuation is at basic prices, especially when a system of VAT, or similar deductible tax, is in operation, although producer's prices may be used when valuation at basic prices is not feasible.

225. Non-market output produced for own final use should be valued at the average basic prices of the same goods or services sold on the market, provided they are sold in sufficient quantities to enable reliable estimates to be made of those average prices. If not, such non-market output should be valued by the total production costs incurred, including consumption of fixed capital. The non-market output produced by government units and NPIs and supplied free, or at prices that are not economically significant, to other institutional units or the community as a whole is valued by total production costs. These costs are calculated after imputing market rentals for buildings owned by government units or NPIs.

b. Intermediate consumption

226. Expenditures on goods or services intended to be used for intermediate consumption should be valued at purchasers' prices. Intermediate inputs obtained from other establishments belonging to the same enterprise should be valued at the same prices as were used to value them as outputs of those establishments plus any transport charges paid to other enterprises.

227. In the absence of VAT or similar deductible taxes, the total value of the intermediate consumption of an enterprise is the same whether valued at purchasers' prices or at producers' or ex-customs prices (see <chapter XV, Supply and Use, Input-Output> for the definition of ex-customs prices). The use of producers' or ex-customs prices implies that purchasers are treated as purchasing the services of wholesalers and retailers separately from the goods which pass through wholesale and retail distribution: they are also treated as purchasing goods and transportation services separately when they are invoiced or purchased separately. While the use of producers' prices leads to a different allocation of expenditures from the use of purchasers' prices, it does not change the total value of the expenditure. However, when a system of VAT or similar taxes is in operation, expenditures by enterprises on goods or services intended for intermediate use may include small amounts of non-deductible VAT which are excluded from the producers' prices.

J. Gross and Net Value Added

1. Introduction

228. Value added is the balancing item in the Production Account for an institutional unit or sector, or establishment or industry. It measures the value created by production and may be calculated either before or after deducting the consumption of fixed capital on the fixed assets used. As already stated:

(1) gross value added is defined as the value of output less the value of intermediate consumption;

(2) net value added is defined as the value of output less the values of both intermediate consumption and consumption of fixed capital.

To avoid repetition, only gross value added will be cited in the following sections when the corresponding conclusions for net value added are obvious.

229. Gross value added is an unduplicated measure of output in which the values of the goods and services used as intermediate inputs are eliminated from the value of output. The production process itself can be described by a vector of the quantities of goods and services consumed or produced in which inputs carry a negative sign. By associating a price vector with this quantity vector, gross value added is obtained as the inner product of the two vectors.

Let q = the vector of quantities consumed or produced
p = the vector of prices

Then

gross value added = $p'q$

Alternative measures of gross value added may be obtained by combining different price vectors with a single quantity vector. For example, gross value added may be measured using the prices of some other time period or some other country. However, the price and quantity vectors cannot be treated as independent. The technology used - that is, the particular production process selected - is itself influenced by the relative input and output prices confronting the producer. A process which is economically efficient and profitable at one set of prices may cease to be so at another. For this reason, figures of gross value added obtained by revaluing the quantities at very different sets of relative prices may have little economic significance.

230. From an accounting point of view, gross value added is essentially a balancing item. As such, it is not an independent entity. It is defined in the context of a production account, being a function of all the other entries in the account. There is no actual set of goods or services that can be identified with the gross value added of an individual producer, sector or

industry. Gross value added is not measured as the sum of any specific set of transactions. As a balancing item, it lacks dimensions in the sense that it has no quantity units of its own in which it can be measured, and hence also no prices of its own.

2. Alternative measures of value added

231. As just indicated, alternative measures of gross value added may be obtained by associating different price vectors with a given vector of input and output quantities. The various measures which may be derived using the different sets of prices recognised in the System are considered below.

a. Gross value added at basic prices

232. Gross value added at basic prices is defined as output valued at basic prices less intermediate consumption valued at purchasers' prices. Although the outputs and inputs are valued using different sets of prices, for brevity the value added is described by the prices used to value the outputs. From the point of view of the producer, purchasers' prices for inputs and basic prices for outputs represent the prices actually paid and received. Their use leads to a measure of gross value added which is particularly relevant for the producer. The resulting measure has also some convenient properties for aggregation purposes as explained later, although there is no named aggregate in the System which corresponds to the sum of the gross values added of all enterprises measured at basic prices.

b. Gross value added at producers' prices

233. Gross value added at producers' prices is defined as output valued at producers' prices less intermediate consumption valued at purchasers' prices. As already explained, in the absence of VAT, the total value of the intermediate inputs consumed is the same whether they are valued at producers' or at purchasers' prices, in which case this measure of gross value added is the same as one which uses producers' prices to value both inputs and outputs. It is an economically meaningful measure that is equivalent to the traditional measure of gross value added at market prices. However, in the presence of VAT, the producer's price excludes invoiced VAT, and it would be inappropriate to describe this measure as being at "market" prices.

234. Both this measure of gross value added and that described in the previous section use purchasers' prices to value intermediate inputs. The difference between the two measures is entirely attributable to their differing treatments of taxes or subsidies on products payable on outputs (other than invoiced VAT). By definition, the value of output at producers' prices exceeds that at basic prices by the amount, if any, of the taxes, less subsidies, on the output so that the two associated measures of gross value added must differ by the same amount.

c. Gross value added at factor cost

235. Gross value added at factor cost is not a concept used explicitly in the System. Nevertheless, it can easily be derived from either of the measures of gross value added presented above by subtracting the value of any taxes, less subsidies, on production payable out of gross value added as defined. For example, the only taxes on production remaining to be paid out of gross value added at basic prices consist of "other taxes on production". These consist mostly of current taxes (or subsidies) on the labour or capital employed in the enterprise, such as payroll taxes or current taxes on vehicles or buildings. Gross value added at factor cost can therefore be derived from gross value added at basic prices by subtracting "other taxes, less subsidies, on production".

236. The difficulty with gross value added at factor cost is that it is not possible to find any vector of prices such that gross value added at factor cost is obtained directly as the difference between the value of output and the value of intermediate consumption. By definition, "other taxes or subsidies on production" are not taxes or subsidies on products that can be eliminated from the prices of outputs or inputs. Thus, despite its traditional name, gross value added at factor cost is not strictly a measure of value added.

237. Gross value added at factor cost is essentially a measure of income and not output. It represents the amount remaining for distribution out of gross value added, however defined, after the payment of all taxes on production and the receipt of all subsidies on production. It makes no difference which measure of gross value added is used because the measures considered above differ only in respect of the amounts of the taxes or subsidies on production which remain payable out of gross value added.

238. Claims on gross value added, other than payments of taxes, less subsidies, to government used to be described as "factor incomes". While the concept of factor income is no longer used in the System, gross value added at factor cost can still be interpreted as measuring the value of the fund out of which "factor incomes" can be paid. Thus, gross value added at factor cost could be described as the gross value of the factor incomes generated by production.

K. The Main Aggregates Associated with Value Added

1. Introduction

239. The underlying rationale behind the concept of GDP for the economy as a whole is that it should measure the total gross values added produced by all institutional units resident in the economy. However, while the concept of GDP is based on this principle, GDP as defined in the System may include not

only the sum of the gross values added of all resident producers but also various taxes on products, depending upon the precise ways in which outputs, inputs and imports are valued.

240. Assume initially that there is no VAT and that production accounts are compiled at "market prices", i.e., with outputs valued at producers' prices and intermediate inputs at purchasers' prices. Suppose further that the production accounts for all resident producers are aggregated and consolidated, thereby eliminating intermediate sales and purchases. It follows that the sum of the gross values added must be identical with the sum of final expenditures on consumption, gross capital formation and exports less imports. This is, of course, the basic identity of national accounting. The identity must hold provided final expenditures and imports are valued consistently with the inputs and outputs in the production accounts. The identity makes it possible to calculate GDP directly from data on final expenditures and imports without utilising production (or income) data. Total GDP can therefore be estimated from production accounts - the production approach - or quite independently from final expenditures and imports - the expenditure approach.

241. In the System, however, GDP at market prices is defined from the expenditure side as total final expenditures at purchasers' prices less total imports valued f.o.b., or free on board, (and not at purchasers' prices including taxes less subsidies on imports). Thus, imports are not valued consistently with final expenditures nor with the entries in the Production Account, so that the identity between GDP from the expenditure side and GDP from the production side breaks down. As import taxes are not deducted along with total imports f.o.b. when calculating GDP from the expenditure side, it follows that import taxes must be added to GDP from the production side in order to restore the identity. Thus, GDP at market prices as defined in the System is the sum of the gross values added of all resident producers at market prices plus taxes less subsides on imports.

242. The situation is more complicated when a system of VAT, or similar deductible taxes, is in operation. As explained earlier, the net system of recording VAT is used in the System: that is, the sales of producers are recorded excluding invoiced VAT while purchases are recorded including VAT which is not deductible by the purchaser. In consequence, the total value of purchases throughout the economy exceeds the value of the corresponding sales by the amount of non-deductible VAT. It follows that not only import taxes but all non-deductible VAT (or similar taxes) must be added to the sum of the gross values added of all resident producers in order to arrive at GDP as defined from the expenditure side.

2. A resume of the main identities

243. Given the general explanations of the previous section, the main identities connecting the aggregates of the System are summarised in this section:

GDP at market prices is defined from the expenditure side as:

household final consumption expenditure at purchasers' prices
\+ government final consumption expenditure at purchasers' prices
\+ NPI final consumption expenditure at purchasers' prices
\+ gross fixed capital formation at purchasers' prices
\+ acquisition less disposals of valuables at purchasers' prices
\+ changes in inventories
\+ exports at purchasers' prices at the frontier (f.o.b.)
\- imports valued f.o.b.

Given this definition of GDP, the following identities hold when the summations are taken over all resident producers:

(1) GDP = the sum of the gross values added at producers' prices
+ taxes, less subsidies, on imports
+ non-deductible VAT

(2) GDP = the sum of the gross values added at basic prices
+ all taxes, less subsidies, on products

(3) GDP = the sum of the gross values added at factor cost
+ all taxes, less subsidies, on products
+ all other taxes, less subsidies, on production

In cases (2) and (3) the item taxes, less subsidies, on products includes taxes and subsidies on imports as well as on outputs.

3. Domestic production

244. GDP is intended to be a measure of the value created by the productive activity of resident institutional units. Although it may not be identical with the sum of the gross values added of resident producers for the kinds of technical reasons just given, it nevertheless includes the gross values added of all resident producers.

245. It should be noted, however, that GDP is not intended to measure the production taking place within the geographical boundary of the economy. Some of the production of a resident producer may take place abroad, while some of the production taking place within the geographical boundary of the economy may be carried out by non-resident producer units. For example, a resident producer may have teams of employees working abroad temporarily on the installation, repair or servicing of equipment. This output is an export of a

resident producer and not part of the GDP of the country in which the productive activity takes places. Thus, the distinction between resident and non-resident institutional units is crucial to the definition and coverage of GDP. In practice, of course, most of the productive activity of resident producers takes place within the country in which they are resident. However, producers in service industries which typically have to deliver their outputs directly to their clients wherever they are located are increasingly tending to engage in production in more than one country, a practice which is encouraged by rapid transportation and instantaneous communication facilities. Geographical boundaries between adjacent countries are becoming less significant for mobile service producers, especially in small countries bordered by several other countries.

Production Account: 13 May 1992

15-Apr-92
06:47

TABLE VI.1 ACCOUNT I: PRODUCTION ACCOUNT

USES								RESOURCES					
S.1 TOTAL ECONOMY	S.15 NON PROFIT INSTITUTIONS SERVING HOUSEHOLDS	S.14 HOUSEHOLDS	S.13 GENERAL GOVERNMENT	S.12 FINANCIAL CORPORATIONS	S.11 NON-FINANCIAL CORPORATIONS	TRANSACTIONS AND BALANCING ITEMS		S.11 NON-FINANCIAL CORPORATIONS	S.12 FINANCIAL CORPORATIONS	S.13 GENERAL GOVERNMENT	S.14 HOUSEHOLDS	S.15 NON PROFIT INSTITUTIONS SERVING HOUSEHOLDS	S.1 TOTAL ECONOMY
						P.1	Output (1)						
						P.11	Market output						
						P.12	Non-market output						
						P.2	Intermediate consumption						
						D.21-D.31	Taxes less subsidies on products (1)						
						B.1g	Value added, gross/Gross domestic product (2)						
						K.1	Consumption of fixed capital						
						B.1n	VALUE ADDED, NET/NET DOMESTIC PRODUCT						

(1) For the valuation of output and the resulting contents of the items "Taxes on Products" and "Taxes on Production and Imports", please refer to the paragraphs ..... in the text.

(2) Gross Domestic Product is equal to the sum of the value added of the institutional sectors plus taxes on products less subsidies. (line ...)